CITY OF WEST SACRAMENTO

SOUTHPORT DRAINAGE MASTER PLAN

UPDATE

May 11, 2001

Prepared By:
Borcalli & Associates, Inc.
Consulting Engineers

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May 11, 2001

Mr. Mark Collier
City of West Sacramento
1951 South River Road
West Sacramento, California 95691

Dear Mark:

Subject: City of West Sacramento, Southport Drainage Master Plan Update (146-08) – Final Southport Drainage Master Plan Update and Executive Summary

In accordance with the Agreement between Borcalli & Associates, Inc. (B&A) and the City of West Sacramento (City), B&A is pleased to provide the final Southport Drainage Master Plan Update, including the separately bound Executive Summary.

It has been a pleasure working with the City in updating the Drainage Master Plan and, at the same time, assisting the City in working with the development community to implement features of the Master Plan.

B&A looks forward to the prospects of working with the City in the future.

Sincerely,

Francis E. Borcalli, P.E.

Enclosures:
- 9 SDMP Update, May 11, 2001
- 9 SDMP Update Executive Summary, May 11, 2001
- 1 Photo-Ready SDMP Update, May 11, 2001
- 1 Photo-Ready SDMP Update Executive Summary, May 11, 2001
- 30 Additional covers for SDMP Update, May 11, 2001
- 30 Additional covers for SDMP Update Executive Summary, May 11, 2001
- 1 Digital Figure 16, "Storm Drainage Pipe Plan, Ultimate, May 11, 2001 (AutoCAD File on CD)

c: Ken Ruzich (w/SDMP Update and Executive Summary)

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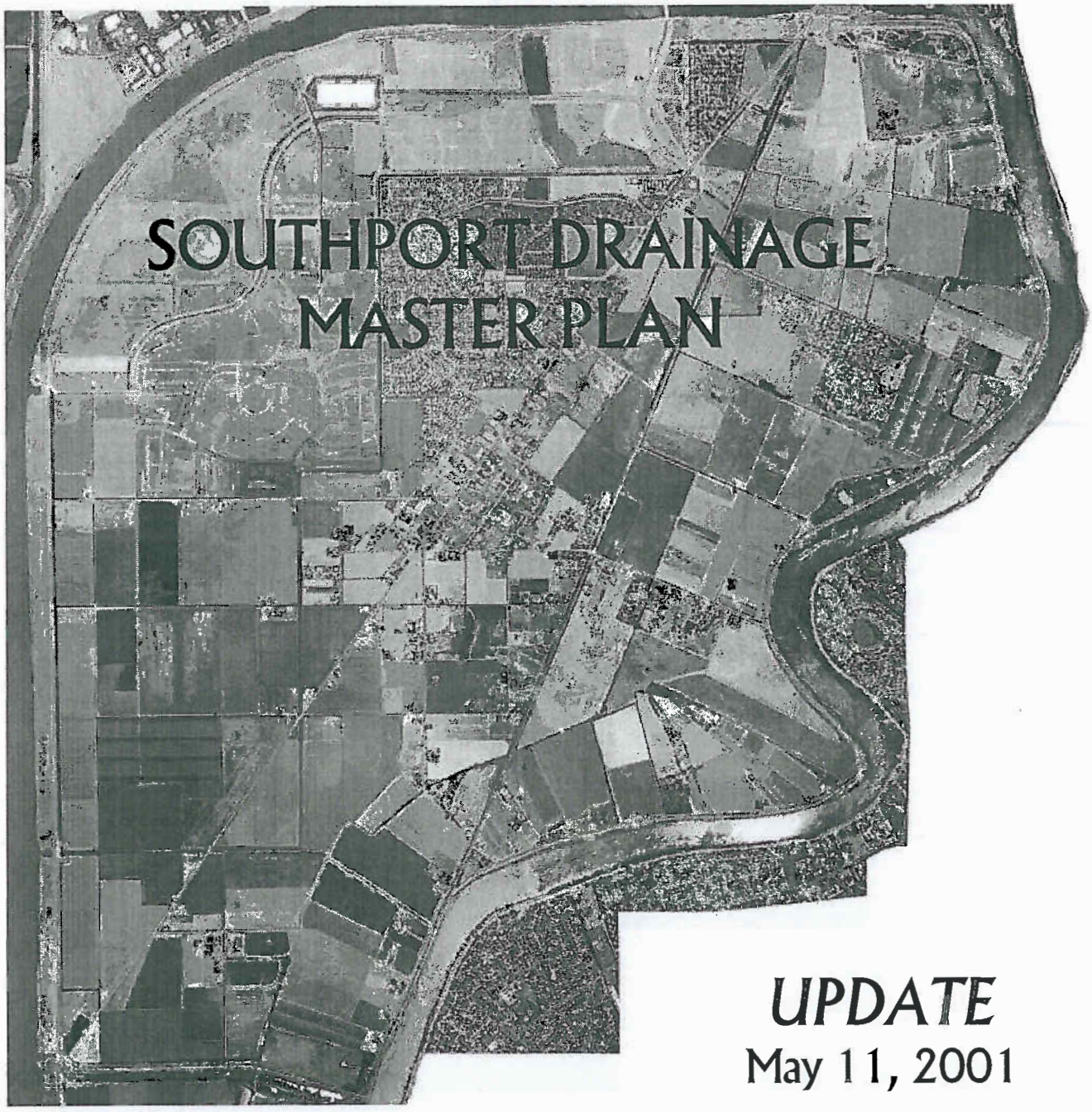
CITY OF WEST SACRAMENTO



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I. INTRODUCTION

A. BACKGROUND

The Southport area of the City of West Sacramento (City) consists of approximately 6,750 acres in the southern portion of the City, as shown on Figure 1, Location Map. The Southport area is bounded on the north and west by the Sacramento River Deep Water Ship Channel (Deep Water Ship Channel), on the east by the Sacramento River, and on the south by the City limits.

In May 1990, the City adopted its General Plan. In 1991, the City created a comprehensive planning area for Southport referred to as the "Southport Framework Plan." Since that time, the "Southport Framework Land Use Plan" has been revised several times with the most current revision in 2000. Several documents were prepared as part of the "Southport Framework Plan" process, including an Implementation Plan, Design Guidelines, and Environmental Impact Report.

In February 1995, Borcalli and Associates, Inc. (B&A) prepared the "Southport Drainage Master Plan" (1995 Southport DMP). The comprehensive report provided the planning-level analyses that defined the drainage facilities required to accommodate development of the Southport area. In July 1996, B&A prepared the report entitled, "Southport Drainage Impact Fees" (Impact Fees Report). The costs for the drainage facilities presented in the 1995 Southport DMP were allocated to lands benefiting from the various facilities. The purpose of the Impact Fees Report was to develop drainage impact fees for new development and to identify cost allocations for existing development to fund the implementation of the master planned drainage facilities for Southport.

The City is currently processing development plans for Southport, and construction has commenced. Within Southport, several drainage studies were prepared for development

projects that are proposed or under construction. The locations of the development projects are shown on Figure 1.

B&A assisted the City in developing drainage design flow standards to incorporate into an update of the "City of West Sacramento Department of Public Works Standard Specifications" (Standard Specifications), dated August 1991. The City's update of the Standard Specifications is scheduled for release in Spring 2001.

B. PURPOSE

The 1995 Southport DMP included planning-level analyses limited to the information available and did not include a detailed phasing plan. As applications and improvement plans for various development projects within Southport were submitted and development commenced, additional information has become available to identify phasing scenarios. In addition, modifications to the 1995 Southport DMP were proposed and/or implemented. The additional information and proposed modifications include more detailed topographic mapping within the development project area; revisions to proposed land uses; revisions to drainage subbasin boundaries and subbasin discharge locations; development phasing scenarios; and a revised approach to address drainage facilities serving rural lands. These changes, along with inflation and current overall economic conditions, result in changes to the Southport master planned facilities and associated costs and drainage fees.

The purpose of the "Southport Drainage Master Plan Update" (DMP Update) is to update the Southport master planned drainage facilities consistent with drainage principles set forth in the 1995 Southport DMP and the more recent drainage principles of the City. The DMP Update identifies changed principles affecting the Southport master planned drainage facilities and includes Opinions of Probable Costs for the proposed phased drainage facilities, allocations of these costs to lands that receive benefit, and revised drainage impact fees for new development.

C. COORDINATION

Coordination with responsible agencies and landowners is essential to develop and implement a feasible comprehensive drainage master plan. To this end, B&A coordinated its work with the City, Reclamation District No. 900 (RD 900), landowners, and consultants of the landowners. The City is the principal agency responsible for processing development plans for lands within the City, including Southport. RD 900 is the principal agency responsible for operating and maintaining the main facilities for conveying and pumping storm drainage within Southport. These facilities include the subbasin detention ponds and pump stations, main channels, and the Main Pump Station. Within Southport, the City is responsible for maintaining storm drainage pipe systems. The primary coordination efforts are described below.

Throughout the development of the DMP Update, B&A met regularly with representatives of the City and RD 900 to discuss the goals, drainage principles, schedule, findings, and other pertinent information for the study. Discussion at these meetings included, but was not limited to, identifying proposed development plans, formulating phasing scenarios, formulating and evaluating drainage principles, formulating environmental and recreational elements associated with the drainage master planned facilities, analyzing drainage master plan alternatives, selecting a Preferred Drainage Plan, and developing alternative cost allocation methodologies.

At key points during the development of the DMP Update, B&A met with the City and representatives of the development projects and landowners to coordinate and discuss available detailed topographic mapping, development plans, and phasing scenarios.

II. DESCRIPTION OF DRAINAGE PRINCIPLES

Guidelines in the form of "Drainage Principles" were established to assist in formulating the 1995 Southport DMP. These Drainage Principles are included in Appendix A.

As part of the coordination efforts described previously, revised and specific drainage principles were established for the DMP Update. These principles are described below:

1. Subbasin-specific drainage facilities improvements will not be included for rural land uses except where rural land uses are part of a subbasin where a significant amount of urban development is proposed. For rural land uses, the 100-year floodplain may remain at existing elevations or less. All proposed pad elevations will be a minimum of one foot above the 100-year floodplain elevation. Additionally, in rural areas, proposed finished floor elevations will be a minimum of one foot above the highest adjacent street centerline elevation.

   This drainage principle represents a significant change from the 1995 Southport DMP. However, there is no additional risk of flood damage as a result of this revised approach.

2. Drainage facilities shall, under no circumstances, cause an increase in the risk of flooding to existing development. However, incidental benefits will be derived from the proposed drainage facilities in existing development areas, agricultural areas, and rural areas.

   Cost allocations are not made to existing developments. Existing developments are defined as those developments that existed in 2000, excluding the Southport Business Park Project (SBP), Bridgeway Island Project (BIP), Gateway Estates, and Newport Estates.

In the 1995 Southport DMP, costs were allocated to existing developments with no collection mechanism identified.

3. A phasing plan shall be formulated that identifies facilities to protect new development from the risk of flooding, avoids adverse impacts to other properties, and ultimately results in completing the Southport master planned drainage facilities. To the extent practical, construction of temporary facilities shall be minimized and shall be subject to the approval of the City and RD 900. Temporary facilities shall not be funded by drainage fees. The phasing plan shall identify flood protection facilities that should be in place prior to each phase of new development. Additionally, phasing of the storm drainage facilities is to occur without adversely affecting irrigation operations and runoff from undeveloped land within a subbasin where development is occurring.

   This drainage principle allows for new detailed phasing scenarios that more closely depict anticipated phasing of development in Southport from those included in the 1995 Southport DMP.

4. Drainage facilities will be identified that are environmentally acceptable to the responsible agencies within Southport, and are compatible with and do not preclude implementing open space, wildlife habitat, wetland, and recreational plans.

   This drainage principle represents a change from the 1995 Southport DMP in the extent of environmental facilities included as drainage master planned facilities. Only drain improvements required for drainage and flood control are included in the DMP Update. At locations of drain improvements, the improvements include wetland benches to mitigate potential environmental impacts along the channel. The improvements do not preclude future construction of planned recreational

corridors that include open space, wildlife habitat, wetland mitigation, and recreational elements.

5. A phasing plan will be coordinated with developing financing plans.

   This drainage principle allows for new detailed phasing scenarios to coordinate with developing financing plans as construction and planning progresses in Southport.

6. The cost for the design, construction, operation, and maintenance of storm drainage facilities shall be allocated to those developments deriving benefit from the respective facilities. Accordingly, cost allocation methodology to determine drainage fees for dwelling units shall reflect contributions to storm water runoff.

   This drainage principle requires a change in the cost allocation methodology for the drainage master planned facilities presented in the Impact Fees Report. In the Impact Fees Report, the cost of the drainage facilities was allocated based upon the proposed subbasin peak discharge rates and the relative contributions to runoff. To equitably allocate all facility costs, the allocation methodology is now based upon the relative contribution to runoff only.

7. Drainage fees shall be based upon existing development agreements in place with the City. The development agreements did not exist during preparation of the 1995 Southport DMP.

III. DESCRIPTION OF STUDY AREA

A. LAND USE

Historically, the predominant land use in Southport was agriculture. Currently, there are several areas with urban residential uses, land transitioning from rural to urban, and rural land uses scattered throughout Southport. Presented on Figure 1 are names of existing development projects within Southport. Commercial uses exist mainly along Jefferson Boulevard. Further detail of historical and present land use is included in later sections of this report.

B. EXTERNAL FLOOD PROTECTION

Flood control levees along the Yolo Bypass, the Deep Water Ship Channel, and the Sacramento River provide flood protection for the City. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), dated January 19, 1995, shows the Southport area within Zone X, Other Flood Areas. Within Southport, FEMA defines Zone X, Other Flood Areas, as follows:

> *"This area protected from the one percent annual chance (100yr) flood by levee, dike, or other structures subject to possible failure or overtopping during larger floods."*

C. INTERNAL DRAINAGE

RD 900 is the principal agency responsible for operating and maintaining the main facilities for conveying and pumping storm drainage within Southport. These facilities include the subbasin detention ponds and pump stations, main channels, and the Main Pump Station. Within Southport, the City is responsible for maintaining the storm drainage pipe systems. Generally, the existing drainage facilities convey storm water runoff to the Main Drain system

in open channels, pipe systems, roadside ditches, ponds, lakes, and/or pump stations. The Main Drain system is a system of open channels that conveys storm water runoff to the Main Drain Pump Station, which is located in the southwest portion of Southport adjacent to the Deep Water Ship Channel. The Main Drain Pump Station pumps drainage to the Deep Water Ship Channel. Constraints were not identified that would limit the discharge rates into the Deep Water Ship Channel.

The existing drainage system is used to convey irrigation water, drainage, and storm water runoff. During the development of the 1995 Southport DMP, operational aspects of the Southport master planned drainage facilities were identified as a result of discussions with RD 900. Constraints were not identified that would limit mixing urban runoff and agricultural runoff within the drainage system.

Currently, portions of the Southport area are subject to flooding. This is common for areas served by agricultural drainage systems. FEMA has not mapped the 100-year floodplain for the internal drainage system serving Southport.

D. TOPOGRAPHY, SOILS, AND SUBSURFACE CONDITIONS

The Southport area slopes from east to west. The ground surface in the western two-thirds of the area is almost level, ranging from approximately El. 6.0 to El. 10.0 (NGVD 29). The ground elevation increases to approximately 20 to 25 feet along the toe of the Sacramento River levee. Topographic information was obtained from U.S. Geological Survey quad maps, topographic mapping provided by landowners, and supplemental field surveys performed during formulation of the 1995 Southport DMP.

The general soils map for Yolo County, California (USDA, 1972), indicates that two soil associations are present in Southport. In the eastern two-thirds of the area, the Sycamore-Tyndall Association is present. This unit occurs mostly in areas where the ground surface is above El. 10, and consists of Sycamore silt loam, Lang sandy and silt loams, and Valdez

silt loam. The U.S. Department of Agriculture Soil Conservation Service (SCS) reports the permeability of these soils to be moderate to rapid near the surface, but slowly permeable at some depth within 20 to 40 inches of ground surface. The sandy and silty textures found in the upper portion of these soil profiles appear to represent overbank deposits near the channel of the Sacramento River.

The Sacramento soil association is found in the area located to the west of the Sycamore-Tyndall Association. This mapping unit primarily consists of the Willows clay and silty clay loams, Sacramento silty clay loam, and the Omni silty clay loam. The SCS reports these soils as moderately to slowly permeable from the ground surface to 20 inches in depth and slowly permeable below 20 inches. The finer textured nature of the surface layers of these soils reflects the more distant location from the channel of the Sacramento River.

Hydrologic soil group information was obtained from maps prepared by the SCS. The Sycamore-Tyndall Association has hydrologic soil characteristics of Group C. The Sacramento Association has hydrologic soil characteristics of Group D. Presented on Figure 2, are locations of Group C and Group D hydrologic soil types within Southport.

Information regarding subsurface soils and groundwater conditions was obtained from available driller logs and geotechnical reports. Available information indicates variable subsurface conditions exist.

Southport is underlain by interbedded sands, silts, and clays of varying consistency. In general, the soils consist of relatively impervious material extending from below the top soil zone to a depth of 30 to 40 feet below the ground surface. A transition of medium to coarse sand begins at a depth of approximately 12 feet along the Deep Water Ship Channel near Marshall Road and terminates at the levee.

In general, groundwater is encountered at depths ranging from four to 10 feet. Information regarding the seasonal variations in groundwater levels or direction of flow is not available.

The granular materials/zones can be expected to freely transmit groundwater. It is possible that some of these zones are hydraulically connected to the Sacramento River and/or the Deep Water Ship Channel.

During the formulation of the 1995 Southport DMP, a qualitative relationship between groundwater and surface water in the Southport area could not be established due to the lack of data. Historical data from seepage investigations (DWR, 1967) conducted during 1963 and 1965, indicated seepage was present during the winter and spring from the Sacramento River and the Deep Water Ship Channel. Seepage areas from the Sacramento River were observed to generally occur within areas located east of the Yolo Shortline Railroad tracks, and primarily located within 2,000 to 3,000 feet from the Sacramento River levee. Seepage areas from the Deep Water Ship Channel were observed to generally occur within 500 to 2,000 feet from the Deep Water Ship Channel levee and to extend from approximately 3,000 feet south of Marshall Road north to the vicinity of Thorp Road.

RD 900 maintains a normal water level elevation of three feet at the Main Drain Pump Station during the wet season. During the dry season, RD 900 maintains a normal water level elevation of 5.5 feet downstream of Marshall Road, and slightly higher upstream of Marshall Road. Groundwater inflows have not posed operational problems with a water surface elevation of three feet maintained at the pump station, even during periods of high stages in the Sacramento River and Deep Water Ship Channel.

IV. FORMULATION OF DESIGN CRITERIA AND STANDARDS

The City's Standard Specifications identify standards, criteria, and specifications for development and construction within the City. Currently, the City is updating its Standard Specifications. As part of this effort, the City requested B&A to analyze and recommend drainage design flow standards. B&A prepared the "Draft Drainage Design Flow Standards Analysis," dated May 17, 2000, and a subsequent letter to Mr. Mark Collier regarding Computational Procedures, dated June 8, 2000, which includes recommendations on drainage design flow standards for the City. The recommendations are incorporated into this DMP Update.

Since different types of drainage facilities serve different purposes that may require different levels of flood protection, water quality treatment, and/or maintenance and operation, it is appropriate to define various types of drainage facilities. The definitions established for the DMP Update include the following two categories of drainage facilities:

- ***Type 1 Drainage Facilities -- Channels, culverts associated with channels, bridges, detention ponds, and pump stations***

- ***Type 2 Drainage Facilities -- Roadside ditches, storm drainage pipe systems, and overland conveyance systems***

Developing drainage master plans on a basin-wide basis will ensure existing and proposed drainage facilities meet the immediate and long-term goals of the community and are consistent with the ultimate drainage master plan facilities. Subbasin-specific drainage master plans should identify drainage facilities that accommodate existing and planned future land uses within the drainage subbasin.

A. TYPE 1 DRAINAGE FACILITIES

Type 1 drainage facilities include conveyance, flood protection, water quality, recreational, environmental, and aesthetic elements, which may consist of channels, culverts associated with channels, bridges, detention ponds, and pump stations. Type 1 drainage facilities should be planned to meet the objectives consistent with the City's General Plan and Standards. In most cases, an analysis of the 10-year and 100-year storm events will provide the information necessary to design and evaluate the existing and proposed drainage system. The duration of the storms used in the analysis should represent the worst-case flooding scenarios with respect to peak flow and peak volume.

Design Flow

Within the West Sacramento Region, the *Sacramento Method* has been widely used to design regional drainage facilities. The *Sacramento Method* is a hydrograph method recently developed by the City and County of Sacramento. The *Sacramento Method* is described in the City's "Draft Drainage Design Flow Standards Analysis," which references the "Sacramento City/County Hydrology Manual, Volume 2: Hydrology Standards." The City's historical precipitation is similar to Zone 2 of the *Sacramento Method*.

The *Sacramento Method* uses the U.S. Bureau of Reclamation's urban unit hydrograph as a basis to estimate runoff hydrographs. The method uses the Flood Hydrograph Program (HEC-1) of the U.S. Army Corps of Engineers to calculate, route, and combine runoff hydrographs. The HEC-1 preprocessor, SACPRE, processes local hydrologic parameters and precipitation to create HEC-1 input.

Design charts have also been created to expedite design flow calculations for basins less than 640 acres. The charts for the *Sacramento Method* are based upon discrete recurrence intervals. Peak flow is given in relation to the drainage area for the 10-year and 100-year recurrence intervals. Peak flow is also given in relation to lag time for the 2-year, 5-year,

10-year, 25-year, 50-year, 100-year, 200-year, and 500-year recurrence intervals. The charts were developed assuming typical hydrologic and hydraulic characteristics for basins of varying sizes.

The *Sacramento Method*, using SACPRE and HEC-1, is an effective method to evaluate flooding where steady state conditions exist. Where unsteady state conditions exist, an unsteady state model such as UNET is an effective tool to evaluate flooding.

For Type 1 drainage facilities within Southport, the *Sacramento Method* will be used for design. Where unsteady state conditions exist, and UNET is used to evaluate flooding, runoff hydrographs within UNET will be developed using SACPRE and HEC-1.

Detention ponds can include water quality elements to treat urban runoff, as presented in the 1995 Southport DMP. J.F. Sato and Associates developed a method to determine the optimum volume of storage for water quality detention ponds. The *Sato Method* is described in the City's "Draft Drainage Design Flow Standards Analysis," which references "Optimization of Stormwater Quality Enhancement by Detention Basin for Sacramento Metropolitan Area." A design chart, specific to the Sacramento Metropolitan area, was developed using the *Sato Method*. For regional water quality detention ponds within Southport, the *Sato Method* will be used to determine the required treatment volume to size wet detention ponds.

Detention Ponds

Detention ponds shall have a minimum of one foot of freeboard in the 100-year storm event. For dual-purpose detention ponds that provide flood control and include a water quality element, the pond should be assumed to be at the water quality pool at the beginning of the storm event. Ponds shall include a minimum 20-foot-wide perimeter buffer with an all-weather access road. The access road shall have a minimum width of 12 feet. The access road shall allow an adequate turning radius for maintenance vehicles. Ramps to the bottom

of the pond with 10 percent maximum slope shall be provided. The side slopes of the ponds shall be 3:1, or flatter, eliminating the need for safety fencing. To the extent practical, the depths of the ponds shall be designed to minimize groundwater seepage into ponds. For wet ponds, a minimum pool depth of three feet is required to inhibit the growth of cattails, which is desirable from a maintenance standpoint.

Pump Stations

In the 1995 Southport DMP, the target outflows from the proposed detention ponds were based upon an economic analysis of the cost of pump stations at the detention ponds, the cost of the Main Drain Pump Station at the Deep Water Ship Channel, and the cost of the detention ponds. Since the publication of the 1995 Southport DMP, changes to the drainage master plan have occurred as a result of the Southport Business Park Project (SBP) and the Bridgeway Island Project (BIP) drainage plan within Subbasin MC60. Rather than draining to the Main Drain, these projects will drain directly to the Deep Water Ship Channel. With the reduction in overall tributary area to the Main Drain, a reevaluation of the target outflow criteria was performed. Based upon this evaluation, it was determined the target outflow criteria presented in the 1995 Southport DMP is still applicable. In addition, the sensitivity of the pond stages to varying watershed loss rates was also evaluated to select target outflows. The target outflow for Subbasin MC10 is one-half the 2-year, 24-hour storm event for the Ultimate Condition. The target outflow of the remaining subbasins with proposed ponds is one-quarter the 2-year, 24-hour storm event for the Ultimate Condition. As previously stated, constraints were not identified that would limit the discharge rates into the Deep Water Ship Channel.

The design of the pump stations shall be in accordance with the City of Sacramento, "North Natomas Drainage Design and Procedures Manual," dated July 1998. Each pump station shall be designed to discharge the design capacity using two mixed-flow vertical pump and motor units. A third pump and motor unit of equal size shall be included as a backup to

provide an installed pumping capacity of one and one-half times the design capacity of the drainage system.

A minimum 10 horsepower pump and motor shall be incorporated into the pump station to discharge runoff occurring during the summer months. The summer flow pump shall be omitted where the horsepower of the pumps required for the design capacity is less than 20 horsepower.

The sump shall be sized according to the Hydraulic Institute Standards for Centrifugal, Rotary and Reciprocating Pumps. Storm water shall be conveyed from the detention pond into the sump through an open inlet section. Before entering the pump vault, the storm water shall pass through a power-driven catenary trash rack system. The invert of each sump shall be lower than the invert of the pond, so the detention ponds can be completely dewatered to facilitate maintenance.

Typically, each pump shall discharge into a separate pipe that includes a combined siphon breaker and air relief valve and vault at the high point on the discharge pipe, and a flap gate with headwall at the terminal structure in the drain. Where discharge lines tend to be long (more than 200 feet), or where the discharge line must cross under existing drains, roads, or railroads, the discharge line shall be manifolded to discharge through a single pipeline. Electrical control equipment shall be enclosed in a prefabricated metal or concrete block building on a concrete foundation with minimum outside dimensions 8 feet wide by 20 feet long. The electrical equipment shall include pump controls, water level detection system, float switch for sump high-water level alarm and low-level automatic shutoff, solenoid-controlled automatic pump motor oiler, and telemetry system. To the extent possible, the type of pump controls and telemetry system shall be uniform throughout Southport. In addition, the building shall be equipped with two doors, wall louvers, rotary turbine roof vent, interior and exterior lighting, and space heater.

Backup power for each pump station shall be provided by on-site diesel generators. Each generator shall be sized to supply power to the drainage pumps running at design capacity, as well as to the electrical control equipment, lighting, and electrical building space heater. The generators shall be radiator-cooled and skid-mounted, and shall include a heater, batteries, battery charger, control panel with auto-start, critical silencer, and generator circuit breaker. The diesel generator and fuel storage tank shall be placed on a concrete pad. The fuel tank shall also be provided with a secondary containment structure. The pump station site shall be enclosed by a 6-foot-high chain link fence topped with three strands of barbed wire. The fencing shall include a 20-foot-wide, double-driven gate and a 3-foot-wide pedestrian gate. The pump station lot shall be sized and the sump, electrical control building, diesel generator, and PG&E transformer arranged to allow adequate operating space for vehicles, pump and motor removal equipment, and maintenance of the trash rack system. The paved access yard shall be at a minimum elevation of two feet above the 100-year water surface elevation, and will be sloped to provide adequate on-site drainage.

During the dry season, pump station controls may be modified to allow higher pool elevations to minimize the rate of seepage and groundwater pumping.

If practical, subbasin pump stations that discharge directly to the Deep Water Ship Channel shall be designed to allow manually-operated hydraulic connections to the Main Drain system for added flexibility and redundancy.

Open Channels, Culverts Associated with Open Channels, and Bridges

Open channels shall have 3:1 side slopes, or flatter. For open channel design, a Manning's "n" roughness factor will be chosen ranging from 0.035 to 0.060, to account for vegetation to minimize maintenance requirements.

Access roads for maintenance shall be provided adjacent to open channels and will have a minimum width of 12 feet. A minimum of one foot of freeboard for the 100-year storm event

shall be provided for open channels, culverts, and bridges. In areas where fill is required to provide freeboard for open channels, three feet of freeboard for the 100-year storm event shall be provided.

B. TYPE 2 DRAINAGE FACILITIES

Type 2 drainage facilities include conveyance, flood protection, water quality treatment, recreational, environmental, and aesthetic elements, which may consist of roadside ditches, storm drainage pipe systems, and overland conveyance systems. It is important to note that emphasis should be placed upon the appropriate design of the overland conveyance system. If the overland conveyance system is appropriately designed, the capacity of the storm drainage pipe systems, roadside ditches, and culverts will have little effect on the risk of property damage or threat to public safety from flooding.

Design Flow

The *Nolte Method*, developed by George S. Nolte, Consulting Civil Engineers, Inc., has provided design flows for drainage basins of all sizes and land uses since the early 1960s. The *Nolte Method* is described in the City's "Draft Drainage Design Flow Standards Analysis," which references the "Sacramento City/County Drainage Manual, Volume 2: Hydrology Standards." The *Nolte Method*, Zone 3, has hydrologic characteristics similar to that of the City.

The Nolte charts were developed by assuming hydrologic features of drainage basins up to 160 acres and calculating runoff using the widely accepted *Rational Method*. The *Nolte Method* design charts vary the precipitation recurrence interval with the size of the drainage basin. For basins less than 30 acres, the recurrence interval is two years. For basins between 30 and 100 acres, the recurrence interval is two to five years. For basins greater than 100 acres, the recurrence interval is five to 10 years. Nolte charts were developed for areas

between 160 acres and two square miles by transition to values based upon the Nolte regional equations for areas greater than two square miles.

The *Nolte Method* will be used to design storm drainage pipe systems and roadside ditches. The *Sacramento Method*, previously described in this report, will be used for the design of overland conveyance systems.

Storm Drainage Pipe Systems

The invert of the storm drainage pipe outfalls at ponds shall be at or above the wet weather water quality pool elevation to prevent standing water within the pipe systems, which can cause sedimentation that could affect the conveyance capacity and longevity of the pipes.

The storm drainage pipe systems shall be designed using the 10-year starting water surface elevation in the detention pond. Hydraulic grade lines shall be computed using Manning's formula with an "n" value to account for friction and minor losses. For concrete pipe, the "n" value shall be 0.015. The minimum pipe slope shall be equal to or greater than the hydraulic slope. To the extent practical, the hydraulic grade line shall be within the pipe. The hydraulic grade line shall be at least one foot below the flow line of the gutter.

Inlets shall be designed in accordance with the City's Standard Specifications. The minimum inlet elevation shall be one foot above the 100-year water surface elevation in the detention pond.

The pipe inverts shall be designed to provide minimum cover at the upstream areas of the drainage sheds. In accordance with the City's Standard Specifications, the minimum cover shall be two feet from the inside top of the pipe to the top of finished grade. Alignment of the pipe shall be in accordance with the City's Standard Specifications.

Sixty-inch manholes shall be used for pipe diameters less than or equal to 42 inches. Seventy-two-inch manholes shall be used for pipe diameters from 48 inches to 54 inches. Saddle manholes shall be used for pipes greater than 60 inches in diameter where intersecting pipes are not present. Manholes shall be in accordance with the City's Standard Specifications.

The location of the pipe discharges at the pond shall be designed to enhance water quality treatment within the pond and to prevent "short- circuiting" flow through the pond.

Overland Conveyance Systems

All new development shall include the design of street systems or other suitable release paths to convey flow in excess of pipe capacity to the pond. The overland conveyance facilities shall provide water surface elevations below the pad elevations in the 100-year storm event. The street system shall be designed to minimize flooding depths within the street. To the extent practical, the overland flooding depths should be designed with a maximum of one foot. The street design shall incorporate designated overland flow paths from the streets to the pond.

Roadside Ditches

Roadside ditches shall be designed to minimize safety hazards and emphasize water quality treatment by implementing Best Management Practices. At a minimum, roadside ditches shall be designed to carry the *Nolte* design flow.

C. FEMA CRITERIA AND STANDARDS

Drainage facilities shall comply with FEMA criteria and standards. These criteria and standards include, but are not limited to, the following:

- One foot of freeboard to existing ground in the 100-year storm event for open channels and ponds.

- Three feet of freeboard in the 100-year storm event for levees. The structural integrity of levees must be certified.

- Backup power and pumping capacity for pump stations.

- Finished floor elevations above the base flood elevation (100-year storm event).

D. CONSISTENCY OF CRITERIA AND STANDARDS

Where the criteria and standards included in the City's Standard Specifications differ from those in this report, consistency between the old and new standards should be addressed as follows:

Rehabilitation Projects

For projects that include maintenance and rehabilitation of existing drainage facilities, a high degree of consideration should be given to the historic performance of the drainage facilities. If existing drainage facilities, requiring repair or maintenance, have performed effectively, the drainage facilities should be replaced with similar facilities. If existing drainage facilities have a record of maintenance, capacity, or other problems, the design of the facilities should address these problems.

Development Projects Tying into Existing Drainage Facilities

For new development projects that include drainage facilities that tie into existing drainage facilities, the design should be based upon the new design standards. However, if implementing the new design flow standards for infill projects results in flows exceeding the

design capacity of the existing drainage system, the City may elect to approve different methodologies on a project-specific basis.

New Development Projects

For new development projects, the design of the drainage facilities should be based upon the design standards in this report.

E. INTERIM CONDITIONS

As development continues to progress in Southport on an incremental basis, interim drainage conditions must be evaluated. Some limited flexibility for criteria and standards may be considered for interim conditions, but in no case shall the following be allowed:

- Risking property damage from flooding.
- Jeopordizing public safety.
- Increasing floodplain elevations to surrounding lands.
- Creating significant impacts to surface or groundwater quality.
- Impacting drainage and irrigation operations for surrounding lands. This will require close coordination with the City, RD 900, and landowners.

Flexibility of criteria and standards, on an interim basis, is at the discretion of the City and RD 900.

V. FORMULATION OF HYDROLOGIC AND HYDRAULIC ANALYSIS

A. APPROACH

The Southport area was divided into subbasins for the existing and future conditions analyses. Computer models (SACPRE, HEC-1, and UNET) and the *Sacramento Method* were used to evaluate the drainage system. The proposed storm drainage pipe systems were evaluated based upon the *Nolte Method* design flow and Manning's formula. The feasibility of the overland conveyance system was evaluated based upon the *Sacramento Method*. The *Sacramento Method* and the *Nolte Method*, as well as the criteria and standards used for the evaluation, are described in other sections of this report.

For the UNET model of the entire Southport area, the 100-year, 24-hour storm event was analyzed. Models representing the following conditions were developed for the entire Southport area:

- Base Condition (1995)
- 2000 Condition
- Ultimate Condition - Alternative A
- Ultimate Condition - Alternative B
- Ultimate Condition - Alternative C (Preferred Drainage Plan)
- Phase 1 of the Preferred Drainage Plan
- Phase 2 of the Preferred Drainage Plan

For design of the detention ponds, the 100-year and 10-year storm events were analyzed. For the 100-year storm event, 24-hour and 10-day durations were analyzed. For the 10-year

storm event, 24-hour and 12-hour durations were analyzed. Models representing the following conditions were developed for the proposed detention ponds:

- Ultimate Condition - Alternative C (Preferred Drainage Plan)
- Phase 1 of the Preferred Drainage Plan
- Phase 2 of the Preferred Drainage Plan

B. LIMITATIONS

The UNET and HEC-1 models are not calibrated . Precipitation and storm water runoff data are not available in the study area. Detailed topographic mapping was not available for the entire Southport area. Accordingly, the model results are approximate.

VI. EVALUATION OF BASE CONDITION

The 1995 Base Condition (Base Condition) reflects the land use and drainage facilities in Southport in 1995. The Base Condition is considered the condition prior to any significant level of development within Southport. Therefore, impacts associated with development can be evaluated by comparing all other conditions to the Base Condition.

A. LAND USE

The land use within Southport in 1995 consisted primarily of agricultural use with the exception of several urban residential development projects, commercial land use along Jefferson Boulevard, and rural residential development scattered throughout the area. Figure 3 presents the land use within Southport in 1995, based upon the City's "General Plan Land Use Diagram," dated December 30, 1993, and the City's Aerial Photograph, dated July 23, 1993.

B. DRAINAGE FACILITIES

Revisions to subbasin boundaries included in the 1995 Southport DMP were made based upon topographic mapping information since 1995. Specifically, the boundary between Subbasin EX10 and EX70 was modified. Additionally, subbasin boundaries and names were modified to facilitate analysis based upon the revised approach for dealing with storm drainage facilities in rural areas, isolating the floodplain for rural land uses from urban land uses. At several locations, revisions to drainage crossings included in the 1995 Southport DMP were made based upon available information.

The drainage facilities consist of open channels, ditches, storm drainage pipe systems, lakes, and pump stations. The drainage facilities and subbasins for the Base Condition are presented on Figure 4. Only Type 1 drainage facilities are shown on Figure 4.

The existing drainage facilities generally convey storm water runoff, by gravity, to the Main Drain system in open channels, ditches, and storm drainage pipe systems. The Larchmont-Summerfield and Touchstone Lake developments are exceptions. In these areas, drainage is conveyed to a detention pond or aesthetic lake and pumped to the Main Drain. Pump capacity curves are not available. However, based upon discussions with RD 900 during the development of the 1995 Southport DMP, the pumping rates for these developments are 67 cfs for Larchmont-Summerfield and 17 cfs for Touchstone Lake.

The Main Drain system flows to the southwest and terminates at the Main Drain Pump Station. The Main Drain Pump Station discharges into the Deep Water Ship Channel.

The existing drainage system is used to convey irrigation water and storm water.

C. DESCRIPTION OF MAIN DRAIN PUMP STATION

Pump capacity curves are not available for the Main Drain Pump Station. Information regarding the pump station capacity was obtained through discussions with RD 900.

The pump station consists of two pumps that were installed in approximately 1911. Each pump has a reported capacity of 135 cfs. However, one of the pumps is extremely unreliable and has not been reflected for purposes of evaluating the existing drainage system. Three additional pumps, having a reported combined capacity of 145 cfs, were installed in approximately 1979. Thus, a total pumping capacity of 280 cfs has been reflected for purposes of this evaluation.

D. FLOODPLAIN

In the Southport area, the estimated 100-year floodplain for the Base Condition ranges from approximately El. 7.3 to El. 10.5. The pumping capacity of the Main Drain Pump Station is exceeded in the 100-year storm event, and flows pond within the drains and low-lying

areas. The 100-year water surface elevation profiles along the drains for the Base Condition are presented on Figure 5.

The 100-year floodplain is not mapped due to lack of topographic mapping. However, the 100-year floodplain elevation for an area can be estimated using the 100-year water surface elevations for the Main Drain system (Figure 5) at points nearest to the area of interest.

VII. EVALUATION OF 2000 CONDITION

Construction projects for new development are underway within Subbasin MC10 and Subbasin MC60. Development projects within the Southport area have moved forward concurrently with the development of the DMP Update. Therefore, early in the process, some assumptions were required to establish modeling scenarios to represent conditions in 2000 (2000 Condition).

A. LAND USE

Development has occurred within the Southport area following preparation of the 1995 Southport DMP. An aerial photograph, developed as part of the DMP Update, dated July 17, 1999, was used to update the land use plan to reflect development in 2000.

In 2000, mass grading occurred within Subbasin MC60, and initial phases were under construction. Development projects within Subbasin MC60 include SBP and BIP (Gainsborough and the Classics). Although initial phases of construction had commenced within Subbasin MC10, development within Subbasin MC10 is not included in the 2000 Condition. Presented on Figure 6 are the land uses for the 2000 Condition.

B. FLOODING AND DRAINAGE IMPACTS OF DEVELOPMENT AND MITIGATION MEASURES

Lands within Subbasin MC60 were mass-graded and now drain to a new pond and pump station that discharges to the Deep Water Ship Channel rather than to the Main Drain system. Development of the BIP will eliminate the Marshall Drain. For the 2000 Condition, the following three scenarios were analyzed:

- 2000 Condition With Marshall Drain
- 2000 Condition Without Marshall Drain
- 2000 Condition Without Marshall Drain With Mitigation Measures

Within Subbasin MC60, the mass grading and construction of the new detention pond and pump station discharging directly into the Deep Water Ship Channel reduces the drainage area contributing to the Main Drain system. It also removes the available floodplain storage within Subbasin MC60. The impacts of removing the Subbasin MC60 drainage area and associated storage area are positive in that the 100-year water surface elevations within the Main Drain system are lowered. However, eliminating the Marshall Drain, as proposed, results in increased water surface elevations in the Main Drain system upstream of Marshall Road. The increased water surface elevations put upstream properties at greater flooding risk. Specifically, existing development along the Morton East Drain would experience greater flooding risk. To mitigate this drainage impact, improvements are proposed to the W. Tapley Drain and Main Drain. The improvements include a 5-foot by 8-foot box culvert at each end of the W. Tapley Drain and a 6-foot by 8-foot box culvert at the Main Drain at Marshall Road. If additional constrictions within the W. Tapley Drain are discovered during the design process, the constrictions will need to be enlarged to provide the equivalent conveyance of a 5-foot by 8-foot box culvert. It may be more practical and cost-effective to construct the ultimate crossing improvements at the Main Drain at the time Marshall Road is improved. If so, three of the four box culverts proposed for the crossing should remain inoperative until downstream improvements are constructed. Additional information regarding drainage impacts and fees for Subbasin MC60 is included in the report prepared by B&A entitled, "Draft Southport Industrial Project and Bridgeway Island Project -- Drainage Impact and Fee Analysis," dated August 3, 2000.

C. DRAINAGE FACILITIES

The 2000 Condition assumes the Subbasin MC60 pond and pump station are constructed, the Marshall Drain is eliminated, and the mitigation measures described above are constructed. Although construction of initial phases of drainage infrastructure within Subbasin MC10 has commenced, drainage facilities within Subbasin MC10 are not included in the 2000 Condition. Presented on Figure 7 are the drainage facilities and subbasins for the 2000 Condition. Only Type 1 drainage facilities are shown.

D. FLOODING

If mitigation measures are implemented, development, as defined by the 2000 Condition, will not create adverse flooding impacts. The proposed minimum finished floor elevations within Subbasin MC60 are above the 100-year floodplain elevations. The 100-year water surface elevation profiles along the drains for the 2000 Condition are presented on Figure 5. The 100-year floodplain is not mapped due to lack of topographic mapping. However, the 100-year floodplain elevations for an area can be estimated using the 100-year water surface elevations for the Main Drain system (Figure 5) nearest to the area of interest.

E. OPINION OF PROBABLE COST FOR 2000 CONDITION MITIGATION MEASURES

The measures required to mitigate the flooding impact for the 2000 Condition include a 5-foot by 8-foot box culvert at each end of the W. Tapley Drain and a 6-foot by 8-foot box culvert at the Main Drain at Marshall Road. The estimated cost of the mitigation measures is $262,000. An Opinion of Probable Cost for these mitigation measures is included in Appendix B (Table B-1).

Development agreements with the City are in place for projects within Subbasin MC60. Based upon information included in these agreements, the cost for the W. Tapley Drain crossing improvements will be funded by projects within Subbasin MC60, and will not be creditable or reimbursable against drainage fees. The cost of the crossing improvements at the Main Drain at Marshall Road will be creditable and/or reimbursable from drainage fees.

VIII. EVALUATION OF SOUTHPORT PLANNED DEVELOPMENT

The Southport Framework Plan includes a land use plan for Southport. Presented on Figure 8 is the ultimate land use in accordance with the Southport Framework Plan, revised in 2000. Presented in Appendix C (Table C-1) is the ultimate land use.

As part of the City's, "Design Guidelines, Southport," revised August 5, 1998, the City developed a typical recreation corridor section along drains within Southport. Presented on Figure 9 is the City's typical recreation corridor section. Proposed development should not preclude future construction of the elements identified in the typical recreation corridor section.

Detailed hydraulic and biologic analyses will be required in conjunction with operational guidelines to determine "bench" elevations and grade to establish wetland areas along the drains.

IX. FORMULATION AND EVALUATION OF ALTERNATIVES

A. COMMON AND SUBBASIN-SPECIFIC DRAINAGE FACILITIES

Certain drainage facilities serve a single subbasin while others serve more than one. For clarification, drainage facilities that serve more than one subbasin are called "common" drainage facilities. Drainage facilities serving a single subbasin are called "subbasin-specific" drainage facilities.

B. ALTERNATIVES

In view of the revised drainage principles, three alternatives with new drainage infrastructure were evaluated (Alternative A, Alternative B, and Alternative C).

Each alternative includes common drainage facility improvements and subbasin-specific drainage facility improvements. Generally, drainage is discharged from the subbasins into the Main Drain system and conveyed in open channels to the Main Drain Pump Station. The Main Drain Pump Station discharges into the Deep Water Ship Channel. Three subbasins with proposed urban development that are adjacent to the Deep Water Ship Channel are planned to discharge directly into the Deep Water Ship Channel.

For each alternative, the proposed capacity of the Main Drain Pump Station is based upon the target water surface elevations in the Main Drain system and the available existing storage at those elevations. The target water surface elevations differ among alternatives. Accordingly, the quantity of levees also differ among alternatives. To the extent the Main Drain Pump Station is upgraded to handle a storm event with a 24-hour duration, it will handle the storm event with a 10-day duration.

Presented on Figure 10, Figure 11, and Figure 12 are typical Drainage Corridor Sections for Alternative A, Alternative B, and Alternative C, respectively. At this time, only drain improvements required for drainage and flood control are included. At locations of drain improvements, the improvements include wetland benches to mitigate potential environmental impacts along that reach of the channel. However, the proposed drainage corridors do not preclude the future environmental and recreational improvements of the planned recreational corridor discussed earlier in this report. Presented on Figure 5 are drain profiles for Alternative A, Alternative B, and Alternative C.

Alternative A

Alternative A includes improving the reliability of the existing Main Drain Pump Station, which has a capacity of 280 cfs. Some existing floodplain storage would be removed as a result of proposed development. Therefore, the floodplain would remain at existing elevations or, in some areas, slightly increase for the Ultimate Condition under Alternative A.

To protect existing and proposed urban lands from flooding, approximately 25,800 lineal feet of certified levees are proposed along the existing drains of the Main Drain system. Approximately 75,000 lineal feet of operating road along the Main Drain system is included to allow access for maintenance and inspection. No levee improvements are proposed to protect rural and agricultural lands; therefore, these areas will not be afforded the 100-year level of protection from flooding.

Within the subbasins with urban development, storm drainage pipe systems and overland conveyance systems will convey storm water runoff to detention ponds or lakes. Pump stations will pump flows from the detention ponds or lakes to the existing Main Drain system or to the Deep Water Ship Channel.

Presented on Figure 13 are the drainage facilities and subbasins proposed for Alternative A. Only Type 1 drainage facilities are shown. Also delineated on Figure 13 are the reaches

where the 100-year water surface elevations within the drains exceed the existing adjacent ground at rural lands.

Alternative B

Alternative B includes improving the reliability and increasing the capacity of the Main Drain Pump Station. A range of capacities was evaluated for the Main Drain Pump Station. A capacity of 700 cfs provided the target water surface elevations. No significant benefits were derived from increasing the Main Drain Pump Station capacity to 900 cfs, as shown on Figure 5. Some existing floodplain storage would be removed as a result of proposed development. Approximately 6,000 lineal feet of drain improvements are proposed for the Main Drain from the Main Drain Pump Station to upstream of the confluence with the South Drain. The drain improvements include widening and, in some locations, slightly deepening. The slope of the invert of the drain will be regraded, and the proposed bottom width of the improved drain will be 60 feet. The drain improvements include a 10-foot-wide wetland bench for each side of the drain. The elevation of the wetland bench is near the summer operating level of the drains. For the Ultimate Condition under Alternative B, the floodplain will be lowered from the existing elevations. Approximately 75,000 lineal feet of operating road along the Main Drain system is included to allow access for maintenance and inspection.

To protect existing and proposed urban lands from flooding, approximately 3,300 lineal feet of certified levees are proposed along the Main Drain. No levee improvements are proposed to protect rural and agricultural lands; therefore, some of these areas will not be afforded the 100-year level of protection from flooding. Drain crossing improvements are proposed at eight locations along the Main Drain, E. Tapley Drain, and Morton East Drain.

Within the subbasins with urban development, storm drainage pipe systems and overland conveyance systems will convey storm water runoff to detention ponds or lakes. Pump stations will pump flows from the detention ponds or lakes to the Main Drain system or to the Deep Water Ship Channel.

Presented on Figure 14 are the drainage facilities and subbasins proposed for Alternative B. Only Type 1 drainage facilities are shown. Also delineated on Figure 14 are the reaches where the 100-year water surface elevations within the drains exceed the existing adjacent ground at rural lands.

Alternative C

Alternative C includes improving the reliability and increasing the capacity of the Main Drain Pump Station. As discussed under Alternative B, a range of capacities was evaluated for the Main Drain Pump Station. A capacity of 700 cfs provided the target water surface elevation. No significant benefits were derived from increasing the Main Drain Pump Station capacity to 900 cfs, as shown on Figure 5. Some existing floodplain storage would be removed as a result of proposed development. Approximately 15,000 lineal feet of drain improvements are proposed for the Main Drain from the Main Drain Pump Station to downstream of the confluence with the Morton East Drain. The drain improvements include widening and, in some locations, slightly deepening. The slope of the invert of the drain will be regraded, and the proposed bottom width of the improved drain ranges from 30 feet to 60 feet. The drain improvements include a 10-foot-wide wetland bench on each side of the drain. The elevation of the wetland bench is near the summer operating level of the drains. For the Ultimate Condition under Alternative C, the floodplain will be lowered from the existing elevations. Approximately 75,000 lineal feet of operating road along the Main Drain system is included to allow access for maintenance and inspection.

There are no levees proposed under Alternative C. By virtue of the design and operation of the facilities, a significant amount of rural and agricultural land will receive improved levels of flood protection. Drain crossing improvements are proposed at eight locations along the Main Drain, E. Tapley Drain, and Morton East Drain.

Within the subbasins with urban development, storm drainage pipe systems and overland conveyance systems will convey storm water runoff to detention ponds or lakes. Pump

stations will pump flows from the detention ponds or lakes to the Main Drain system or to the Deep Water Ship Channel.

Presented on Figure 15 are the drainage facilities and subbasins proposed for Alternative C. Only Type 1 drainage facilities are shown. Also delineated on Figure 15 is a short reach along a portion of the E. Tapley Drain where the 100-year water surface elevation exceeds the existing adjacent ground at rural lands.

C. PREFERRED DRAINAGE PLAN SELECTION

The three alternatives vary in the extent and magnitude of the floodplain and in the cost for the common drainage facilities. The subbasin-specific costs are the same for all three alternatives.

Due to the extensive amount of levees required for Alternative A, the effort involved in maintaining the proposed levee system is significant. Based upon discussions with the City and RD 900, it was agreed that Alternative A was not desirable due to the high level of dependency on levees for flood protection. In addition to protecting existing and proposed urban development without extensive levees, Alternative B and Alternative C provide significant floodplain reduction for rural and agricultural lands. Accordingly, preliminary costs for the common drainage facilities for Alternative B and Alternative C were developed to assist in selecting a Preferred Drainage Plan.

The estimated cost for the common drainage facilities for Alternative B is $18,136,000, and for Alternative C is $18,557,000. A summary of the Opinions of Probable Cost for common drainage facilities for Alternative B and Alternative C is presented on Table 1. Detailed costs for Alternative B are included in Appendix B (Table B-2 and Table B-3). Detailed costs for Alternative C are included in Appendix B (Table B-4 and Table B-5).

TABLE 1

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUMMARY OF OPINIONS OF PROBABLE COST
COMMON DRAINAGE FACILITIES
ALTERNATIVE B AND ALTERNATIVE C

Description	Total Cost, $[1]	
	Alternative B	Alternative C (Preferred Plan)
Common Drainage Facilities Construction Cost		
1. Main Drain Pump Station Improvements	9,282,500	9,282,500
2. Main Drain Channel Improvements	360,200	683,700
3. Main Drain Levee Improvements	33,400	0
4. Road Crossing Improvements	1,718,300	1,718,300
5. Maintenance Road Improvements	1,050,000	1,050,000
Subtotal Construction Cost	12,444,400	12,734,500
Construction Contingencies (25%)	3,111,100	3,183,625
Engineering (20%)	2,488,880	2,546,900
Subtotal	18,044,380	18,465,025
Common Drainage Facilities Land Acquisition Cost		
1. Main Drain Pump Station	7,200	7,200
Subtotal Land Acquisition Cost[2]	7,200	7,200
Land Contingencies (35%)	2,520	2,520
Acquisition Allowance (25%)	1,800	1,800
Contingency on Acquisition Allowance (25%)	450	450
Subtotal	11,970	11,970
Southport Drainage Master Plan Update Study	80,000	80,000
TOTAL	18,136,000	18,557,000

[1]Costs are based upon 2000 price levels.

[2]Land acquisition cost does not include drainage corridor acquisition for Main Drain channel improvements. It is assumed existing rights-of-way or easements are in place or that lands will be dedicated.

Alternative C is the Preferred Drainage Plan, since it is the most cost-effective plan due to providing 100-year level of flood protection for the most land in the Southport Area.

The Preferred Drainage Plan, which includes common drainage facilities and subbasin-specific drainage facilities, was selected since it best accommodates the City's drainage principles.

X. EVALUATION OF PREFERRED DRAINAGE PLAN - ULTIMATE CONDITION

A. DRAINAGE FACILITIES

The Preferred Drainage Plan includes common drainage facilities and subbasin-specific drainage facilities. Presented on Figure 15 are the drainage facilities and subbasins proposed for the Preferred Drainage Plan. Only Type 1 drainage facilities are shown. The mitigation measures for the 2000 Condition that are not funded by drainage fees are assumed to be in place. Therefore, they are not included as proposed facilities.

Common Drainage Facilities

The common drainage facilities for the Preferred Drainage Plan are described earlier in this report and include the following:

- Improving the reliability and increasing the capacity of the Main Drain Pump Station to 700 cfs.

- Improving approximately 15,000 lineal feet of the Main Drain from the Main Drain Pump Station to downstream of the confluence with the Morton East Drain (see Figure 12, Drainage Corridor Typical Section – Alternative C). The drain improvements include widening and, in some locations, slightly deepening. The slope of the invert of the drain will be regraded, and the proposed bottom width of the improved drain ranges from 30 feet to 60 feet. The drain improvements include a 10-foot-wide wetland bench on each side of the drain. The elevation of the wetland bench is near the summer operating level of the drains.

- Improving drain crossings at eight locations along the Main Drain, E. Tapley Drain, and Morton East Drain.

- Improving approximately 75,000 lineal feet of operating road along the Main Drain system for maintenance and inspection.

Subbasin-Specific Drainage Facilities

Within the subbasins where urban development is planned, storm drainage pipe systems and overland conveyance systems will convey storm water runoff to detention ponds or lakes. Water will be pumped from the detention ponds or lakes to the existing Main Drain system or to the Deep Water Ship Channel.

There are 11 subbasins with existing and/or proposed urban development. This report includes the design of subbasin-specific drainage facilities for eight of these subbasins. The design of the subbasin-specific drainage facilities for Subbasin MC60 (SBP and BIP) is not included in this report but is included in the report entitled, "Storm Drainage Master Plan Bridgeway Island/Southport Industrial Park," prepared by Nolte & Associates, Inc., dated August 1999. Subbasin MC50 (Larchmont-Summerfield) consists primarily of existing development; therefore, a detailed analysis of the subbasin-specific infrastructure is not included in this report. Subbasin MC30 (Touchstone) consists primarily of existing development. The proposed Pheasant Hollow Subdivision is planned to drain to the existing Touchstone Lake and pump station. The design of the subbasin-specific drainage facilities for the Pheasant Hollow Subdivision is not included in this report but is included in a report entitled, "Pheasant Hollow Subdivision, City of West Sacramento Storm Drainage Calculation for Routing to Touchstone Lake," prepared by Laugenour and Meikle, Civil Engineers, dated August 23, 1993.

The subbasin-specific drainage facilities within the eight subbasins with proposed urban development are designed to reduce the 100-year floodplain to the proposed detention pond sites or lakes in accordance with the standards of the City and FEMA, and approval of RD 900. Presented on Table 2 is a summary of preliminary detention pond and pump station design parameters for the eight urban subbasins. Presented on Figure 16 is the Storm

TABLE 2

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUMMARY OF PRELIMINARY DETENTION POND AND PUMP STATION DESIGN PARAMETERS FOR URBAN SUBBASINS

Subbasin[1]	Subbasin Area ac	Impervious Area %	Peak Flow 2-Year, 24-Hour Storm Event cfs	Target Pump Station Discharge[2] cfs	Pond and Pump Station Site Area[3] ac	Average Pond Bottom Elevation ft msl	Required W.Q. Unit Storage[4] in	W.Q. Treatement Volume[4] ac-ft	W.Q. Pool Elevation[5] ft	100-Year Storm Event		10-Year Storm Event	
										Flood Control Volume ac-ft	Maximum Water Surface Elevation ft	Flood Control Volume ac-ft	Maximum Water Surface Elevation ft
MC10	876	36	259	130	17.0	-7.7	0.37	27	-4.7	126	4.6	80	0.5
MC11	102	70	66	16	4.5	-4.0	0.71	6.0	-1.0	23	4.5	15.6	2.3
MC20	463	66	189	48	13.1	-6.0	0.65	25	-3.0	111	3.9	76	1.2
MC71	33	30	22	6	1.5	-4.5	0.33	1.0	-1.5	6.1	4.1	3.9	1.9
MC80	545	35	177	44	12.2	-12.0	0.36	16	-9.0	110	1.0	65	-3.3
NC10	445	35	143	36	9.5	-8.0	0.36	13	-5.0	82	5.1	50	0.7
NC20	87	47	37	10	3.2	-7.5	0.45	3.3	-4.5	16.2	3.1	10.2	-0.1
SC10	450	31	152	38	11.7	-3.0	0.34	13	0.0	84	7.7	52	4.4

[1]Subbasin MC30 and Subbasin MC50 have existing ponds and pump stations. Only subbasins with proposed ponds and pump stations are included, except for Subbasin MC60. See the report entitled, "Bridgeway Island and Southport Industrial Park Project Storm Drainage Master Plan," dated August 1999, for information regarding the Subbasin MC60 detention pond and pump station.

[2]Target outflow for subbasin pump stations is equal to one-quarter of the peak flow from the 2-yr, 24-hr storm event, except for Subbasin MC10. Target outflow for Subbasin MC10 is equal to one-half of the peak flow from the 2-yr, 24-hr storm event.

[3]Pond and pump station site area is based upon a preliminary pond design with 3:1 side slopes and a pump station that requires one-quarter of an acre. More or less acreage may be required and will be determined during the design process.

[4]Water quality treatment unit storage rates and volumes are based upon the *Sato Method*.

[5]The water quality pool elevation is based upon wet weather conditions. During the dry season, the operation of the pool levels may be modified.

Drainage Pipe Plan for the Ultimate Condition. Design flow calculations for the proposed storm drainage pipe and overland conveyance system are included in Appendix D. Additional information regarding Subbasin MC10 is included in the report entitled, "Draft Subbasin MC10 Drainage Master Plan," prepared by B&A, dated February 8, 2000. Additional information regarding Subbasin MC71 is included in the report entitled, "Draft Subbasin MC71 (Rivermont Project) Drainage Master Plan," prepared by B&A, dated June 16, 2000.

This report does not include subbasin-specific drainage improvements for the remaining subbasins, which consist primarily of rural and agricultural lands. Within the rural and agricultural subbasins, the 100-year floodplain elevations will be reduced but may not be eliminated. When development occurs within rural subbasins, drainage systems within the rural areas (general roadside ditches), will be designed and constructed, as necessary, on a project-specific basis with the approval of the City and RD 900.

B. FLOODPLAIN

Under the Preferred Drainage Plan, the 100-year floodplain will be significantly lowered from the existing elevations. As a result of lowering the floodplain, internal levees will not be required to protect existing and proposed urban development. By virtue of the design and operation of the facilities, a significant amount of rural and agricultural land will receive improved levels of flood protection. Presented on Figure 15 is a small reach along a portion of the E. Tapley Drain where the 100-year water surface elevation exceeds the existing adjacent ground at rural lands.

The 100-year floodplain is not mapped due to the lack of topographic mapping. However, the 100-year floodplain elevation for an area can be estimated using the 100-year water surface elevations for the Main Drain system (Figure 5) nearest to the area of interest.

XI. FORMULATION OF PHASING SCENARIOS

In cooperation with the City and RD 900, two phases, Phase 1 and Phase 2, were established representing probable increments of development based upon projects currently proposed or under construction within Southport. Phase 1 and Phase 2 represent approximately 868 acres of the total 4,959 acres planned for development. No definitive phasing plan was delineated for the remainder of the land planned for development. Actual development phasing may differ from that presented below.

A. PHASE 1 DEVELOPMENT PROJECTS

Phase 1 development consists of approximately 324 acres within Subbasin MC10, Subbasin MC20, and Subbasin MC71. Presented on Figure 17 and Appendix C (Table C-40), are the Phase 1 land uses.

Within Subbasin MC10, Phase 1 development consists of approximately 100 acres of the Newport Estates Project and approximately 22 acres of the Gateway South Project. The proposed Phase 1 development within Subbasin MC10 includes Low-Density Residential, Recreation and Park, and Open Space.

Within Subbasin MC20, Phase 1 development consists of 169 acres of the Seaway International Project. The proposed Phase 1 development within Subbasin MC20 includes Business Park, Water Related Industrial, Recreation and Park, and Open Space.

Within Subbasin MC71, Phase 1 development consists of the full buildout of approximately 33 acres of the Rivermont Project. The proposed Phase 1 development within Subbasin MC71 includes Low-Density Residential and Open Space.

B. PHASE 2 DEVELOPMENT PROJECTS

Phase 2 development consists of approximately 544 acres within Subbasin MC10 and Subbasin MC80. Presented on Figure 18 and Appendix C (Table C-41) are the Phase 2 land uses.

Within Subbasin MC10, Phase 2 development consists of approximately 162 acres of the Newport Estates Project, the remaining 51 acres of the Gateway South Project, the entire 48 acres of the River Ranch Project, and 7 acres of the Parella property. The proposed Phase 2 development within Subbasin MC10 includes Low-Density Residential, Medium-Density Residential, High-Density Residential, Mixed Use, Public/Quasi Public, Recreation and Park, and Open Space.

Within Subbasin MC80, Phase 2 development consists of approximately 276 acres of the Southport Keys Project. The proposed Phase 2 development within Subbasin MC80 includes Low-Density Residential, Medium-Density Residential, High-Density Residential, Public/Quasi Public, Recreation and Park, and Open Space.

XII. EVALUATION OF PREFERRED DRAINAGE PLAN - PHASE 1 CONDITION

Hydrologic and hydraulic computer models were developed to represent the Phase 1 Condition of the Preferred Drainage Plan. The Phase 1 land use assumptions are described earlier in this report. Additional information regarding Phase 1 of Subbasin MC10 is included in the report entitled, "Draft Subbasin MC10 Drainage Master Plan," and for Subbasin MC71 in the report entitled, "Draft Subbasin MC71 Drainage Master Plan."

A. DRAINAGE FACILITIES

The Phase 1 drainage facilities include subbasin-specific drainage facilities within Subbasin MC10, Subbasin MC20, and Subbasin MC71. Common drainage facilities are not required for Phase 1. Presented on Figure 19 are the drainage facilities and subbasins for Phase 1. Only Type 1 drainage facilities are shown. The subbasin-specific drainage facilities for Phase 1 are described below.

Subbasin-Specific Drainage Facilities

Subbasin MC10

The Phase 1 subbasin-specific drainage facilities within Subbasin MC10 include a storm drainage pipe system, an overland conveyance system, and the Phase 1 portion of a detention pond.

Approximately 461 acres within Subbasin MC10 will drain to ditches that discharge to the proposed Phase 1 pond. Approximately 300 acres within Subbasin MC10 will drain to the Yolo Shortline Ditch, bypassing the proposed Phase 1 pond, and continue to drain to the culvert under the Yolo Shortline Railroad.

Storm drainage pipe systems shall be constructed in accordance with Figure 16, and will drain by gravity to the proposed Phase 1 pond. The sections of the storm drainage pipe system to be constructed as part of Phase 1 are Node A10 to Node A6, Node B54 to Node B5, Node D6 to Node D2, and a portion of storm drainage pipe from Node D7 to Node D6.

Excavating a portion of the ultimate pond facility will be completed with Phase 1. The location of the Phase 1 pond is adjacent to the Yolo Shortline Railroad at the culvert discharging under the Yolo Shortline Railroad. The pond site acreage for Phase 1 is approximately five acres. The bottom of the pond is approximately El. -2.0. The permanent pool elevation of the pond is controlled by the downstream invert elevation of the box culverts at the Main Drain and Jefferson Boulevard crossing and the invert of the pond outfall pipe at approximately El. 3.0.

The Phase 1 pond will function as a wet water quality pond. The required treatment volume for the area draining to the Phase 1 pond is 10 acre feet. The dirt excavated for the Phase 1 pond shall be used for fill within the first phase of the Newport Estates development, in accordance with the geotechnical engineer's recommendations. An all-weather access road for maintenance of the Phase 1 pond facility shall be provided.

Subbasin MC20

Others are currently developing a drainage plan for the first phase of Subbasin MC20, Seaway International Project. The first phase of development will drain on an interim basis to the Main Drain. Ultimately, the entire Seaway International Project will drain to the upper portion of Lake Washington and discharge to the Deep Water Ship Channel. Phase 1 subbasin-specific drainage facilities are not identified in this report for Subbasin MC20.

Subbasin MC71

Phase 1 includes all the subbasin-specific drainage facilities planned for Subbasin MC71. These facilities include a dual-purpose flood control and water quality detention pond, pump station, storm drainage pipe system, and overland conveyance system.

B. FLOODPLAIN

In some areas, the maximum 100-year water surface elevations in the drains are higher for Phase 1 than in the 2000 Condition; however, in no case are the maximum 100-year water surface elevations in the drains higher than in the Base Condition.

Presented on Figure 20 are drain profiles for the Base Condition, 2000 Condition, Phase 1, and Phase 2.

Within Subbasin MC71 for Phase 1, the 100-year water surface elevation at the proposed detention pond is El. 4.8, which is the same elevation as in the Ultimate Condition.

XIII. EVALUATION OF PREFERRED DRAINAGE PLAN - PHASE 2 CONDITION

Hydrologic and hydraulic computer models were developed to represent the Phase 2 Condition of the Preferred Drainage Plan. The Phase 2 land use assumptions are described earlier in this report. Additional information regarding Phase 2 of Subbasin MC10 is included in the report entitled, "Draft Subbasin MC10 Drainage Master Plan."

A. DRAINAGE FACILITIES

The Phase 2 drainage facilities include a portion of the common drainage facilities and portions of the subbasin-specific drainage facilities within Subbasin MC10 and Subbasin MC80. Presented on Figure 21 are the drainage facilities and subbasins for Phase 2. Only Type 1 drainage facilities are shown on Figure 21.

Common Drainage Facilities

The common drainage facilities for Phase 2 include the following:

- Improving the reliability and increasing the capacity of the Main Drain Pump Station to 550 cfs.

- Improving approximately 15,000 lineal feet of the Main Drain from the Main Drain Pump Station to downstream of the confluence with the Morton East Drain (see Figure 12, Drainage Corridor Typical Section – Alternative C). The drain improvements include widening and, in some locations, slightly deepening. The slope of the invert of the drain will be regraded, and the proposed bottom width of the improved drain ranges from 30 to 60 feet. The drain improvements include a 10-foot-wide wetland bench on each side of the

drain. The elevation of the wetland bench is near the summer operating level of the drains.

- Improving drain crossings in three locations along the Main Drain.

- Improving approximately 50,000 lineal feet of operating road along the Main Drain system for maintenance and inspection.

Subbasin-Specific Drainage Facilities

The subbasin-specific drainage facilities for Phase 2 are described below.

Subbasin MC10

The Phase 2 subbasin-specific drainage facilities within Subbasin MC10 include a storm drainage pipe system, overland conveyance system, ditches, pond expansion, and pump station.

The extension of Lake Washington Boulevard from Subbasin MC10 westward across the Yolo Shortline Railroad to Jefferson Boulevard will be required when approximately 300 new dwelling units are developed within Subbasin MC10. This development threshold was established by the City to ensure adequate access. An at-grade crossing is planned for Lake Washington Boulevard at the Yolo Shortline Railroad. Lake Washington Boulevard will be designed to convey overland flow to the pond; therefore, the existing floodplain within the vicinity of Lake Washington Boulevard will need to be reduced.

The entire Subbasin MC10, excluding the northeastern leveed portion of the site, will drain to ditches and/or pipes that discharge to the pond. Storm drainage pipe systems shall be constructed in accordance with Figure 16, and will drain by gravity to the proposed pond. The sections of the storm drainage pipe system constructed as part of Phase 2 are Node A6

to the pond, Node A50 to Node A1, the remainder of the Trunk B system, Node C4 to the pond, and the remainder of the Trunk D system.

The Yolo Shortline Ditch culvert connection under Linden Road will be gated or abandoned to isolate development north of Linden Road from the floodplain south of Linden Road. The culvert under the Yolo Shortline Railroad shall be abandoned.

Excavation of the ultimate wet pond facility will be constructed with Phase 2. The required treatment volume for the area draining to the pond is 10.5 acre feet. The ultimate pump station will be constructed, but installation of only half the pump capacity, 65 cfs, is required. The pump station will discharge water from the pond to the Main Drain west of the Yolo Shortline Railroad. To the extent suitable, the material excavated from the pond shall be used as fill for low-lying areas within the River Ranch Project and the Newport Estates Project.

Subbasin MC80

The Phase 2 subbasin-specific drainage facilities within Subbasin MC80 include a storm drainage pipe system, an overland conveyance system, ditches, detention pond, and a pump station. In Phase 2, approximately 322 acres within Subbasin MC80 will drain to the pond.

With the exception of approximately 2,400 lineal feet of trunk storm drainage pipe north of the proposed Phase 2 development within Subbasin MC80, all of the trunk storm drainage pipe system will be constructed. The ultimate detention pond and pump station will be constructed, but only half of the pumping capacity, 22 cfs, will be installed.

B. FLOODPLAIN

Implementing the Phase 2 common drainage facilities results in significantly lowering the peak stages in the Main Drain. Lowering the peak stages in the Main Drain is necessary for

development within Subbasin MC80. Excluding development within Subbasin MC80 for Phase 2 would significantly reduce the common drainage facilities required for Phase 2.

Presented on Figure 20 are drain profiles for the Base Condition, 2000 Condition, Phase 1, and Phase 2.

Within Subbasin MC10 for Phase 2, the 100-year flood control storage volume in the proposed detention pond is 122 acre feet, and the water surface is at El. 4.2. Within Subbasin MC10 for Phase 2, the 10-year flood control storage volume in the proposed detention pond is 75 acre feet, and the water surface is at El. 0.1.

Within Subbasin MC80 for Phase 2, the 100-year flood control storage volume in the proposed detention pond is 68 acre feet, and the water surface is at El. -3.2.

XIV. DEVELOPMENT OF OPINION OF PROBABLE COSTS

Based upon 2000 price levels, Opinions of Probable Capital Costs, including construction, land acquisition, engineering, and contingencies, were developed for the drainage facilities identified in the Preferred Drainage Plan, Phase 1, and Phase 2. In addition, Opinions of Probable Operation and Maintenance Costs (O&M) were developed for the drainage system identified in the Preferred Drainage Plan.

A. CAPITAL COSTS

As noted earlier in this report, costs for subbasin-specific drainage facilities are not included for Subbasin MC30 and Subbasin MC60. Also, costs for subbasin-specific drainage facilities are not identified for Phase 1 of Subbasin MC20. Costs for the 2000 Condition mitigation measures that will not be funded by drainage fees are included separately.

Storm drainage pipe systems for pipes with diameters of 33 inches and larger are considered trunk facilities, and only costs for these trunk facilities are included in this report. It is assumed that the design of the project will incorporate streets or other suitable paths for overland conveyance. Therefore, costs for overland conveyance systems are not included. Land acquisition costs for channel improvements to the Main Drain are not included in this report. Based upon information provided by RD 900, it is assumed that existing rights-of-way or easements are in place or that lands will be dedicated for the Main Drain channel improvements. For cost estimating purposes, the elevation of the proposed wetland bench was assumed to be at El. 5.5. However, the actual elevation may differ.

The Opinion of Probable Cost for the Preferred Drainage Plan is $60,734,000. The Opinion of Probable Cost for the Common Drainage Facilities and Subbasin-Specific Drainage Facilities is $18,557,000 and $42,177,000, respectively. Presented on Table 3 is a summary

TABLE 3

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUMMARY OF OPINIONS OF PROBABLE COST
PREFERRED DRAINAGE PLAN

Description	Cost,$[1]
Common Drainage Facilities	18,557,000
Subbasin Specific Drainage Facilities[2]	
Subbasin MC10	12,246,000
Subbasin MC11	2,159,000
Subbasin MC20	6,671,000
Subbasin MC71	488,000
Subbasin MC80	7,717,000
Subbasin NC10	6,102,000
Subbasin NC20	1,179,000
Subbasin SC10	5,615,000
Subtotal Subbasin Specific Drainage Facilities	42,177,000
TOTAL	60,734,000

[1]Costs are based upon 2000 price levels.

[2]Costs for subbasin-specific drainage facilities for subbasins MC30 and MC60 are not included in this report. Refer to the report entitled, "Bridgeway Island and Southport Industrial Project Storm Drainage Master Plan," dated August 1999, for more information on Subbasin MC60 drainage facilities. Refer to the report entitled, "Pheasant Hollow Subdivision, City of West Sacramento Storm Drainage Calculations for Routing to Touchstone Lake," dated February 24, 1997, for more information on Subbasin MC30 drainage facilities.

of the Opinions of Probable Cost for the Preferred Drainage Plan. Detailed cost estimates for common drainage facilities and subbasin-specific drainage facilities for each subbasin are included in Appendix B.

Although the extent of drainage master planned facilities has been significantly reduced since the 1995 Southport DMP, the cost has only decreased by approximately 10 to 15 percent. This can be attributed to inflation and overall economic conditions.

The Opinion of Probable Cost for Phase 1 of the Preferred Drainage Plan is $2,273,000. The Opinion of Probable Cost for the Common Drainage Facilities and Subbasin-Specific Drainage Facilities is $80,000 and $2,193,000, respectively. The Common Drainage Facilities cost for Phase 1 represents the cost of preparing the DMP Update.

The Opinion of Probable Cost for Phase 2 of the Preferred Drainage Plan is $29,287,000. The Opinion of Probable Cost for the Common Drainage Facilities and Subbasin-Specific Drainage Facilities is $13,291,000 and $15,996,000, respectively.

Presented on Table 4 is a summary of Opinions of Probable Cost for Phase 1 and Phase 2 of the Preferred Drainage Plan. Detailed cost estimates are included in Appendix B.

B. ANNUAL OPERATION AND MAINTENANCE COSTS

An Opinion of Probable Annual O&M Costs for the drainage system, consistent with the Preferred Drainage Plan, was developed based upon the experience of the U.S. Army Corps of Engineers for similar projects. The costs include wages, vehicles, incidental staff costs, specialty equipment, and power associated with operating and maintaining the detention ponds, pump stations, drains, and operating roads.

TABLE 4

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUMMARY OF OPINIONS OF PROBABLE COST
PREFERRED DRAINAGE PLAN
PHASE 1 AND PHASE 2

Description	Cost,$[1]
Phase 1	
Common Drainage Facilities	
2000 Southport Drainage Master Plan Update Study	80,000
Subbasin Specific Drainage Facilities	
Subbasin MC10 - Phase 1	$1,705,000
Subbasin MC20[2]	?
Subbasin MC71	$488,000
Subtotal Subbasin Specific Drainage Facilities	$2,193,000
TOTAL PHASE 1	$2,273,000
Phase 2	
Common Drainage Facilities	13,291,000
Subbasin Specific Drainage Facilities	
Subbasin MC10 - Phase 2	$9,337,000
Subbasin MC80	$6,659,000
Subtotal Subbasin Specific Drainage Facilities	$15,996,000
TOTAL PHASE 2	$29,287,000

[1]Costs are based upon 2000 price levels.

[2]Seaway International is currently developing a drainage plan for Phase 1 of Subbasin MC20. This report does not identify costs for Phase 1 of Subbasin MC20.

Maintenance will consist of repairs to embankment side slopes and earthen channels. Earthen channels will be cleaned periodically to ensure conveyance capabilities are not reduced as a result of vegetation. Sedimentation in detention ponds will be removed, as required, to ensure it does not reduce the flood control and water quality treatment characteristics of the system. Periodic inspections and maintenance will be required for subbasin pump stations. Backup power systems will be checked on a regular basis along with other appurtenant project features (i.e., trash racks, pump bearing/seal lubrications, electrical controls, etc.).

The Opinion of Probable Annual O&M costs is approximately $336,000. These costs do not include operation and maintenance for the existing detention ponds and pump stations within Subbasin MC30, Subbasin MC50, and Subbasin MC60. Presented on Table 5 is a summary of these costs.

TABLE 5

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
ANNUAL OPERATIONS AND MAINTENANCE
PREFERRED DRAINAGE PLAN

Description	Quantity	Unit	Unit Cost, $[1]	Total Cost, $
Common Drainage Facilities				
1. Main Drain Pump Station[2]	1	ls	135,000.00	135,000
2. Drains	14.2	mi	1,600.00	22,700
3. Operating Roads	14.2	mi	500.00	7,100
Subbasin Specific Drainage Facilities[3]				
4. Subbasin MC10				
a. Pump Station[2]	1	ls	30,500.00	30,500
b. Detention Pond[4]	1	ls	15,900.00	15,900
5. Subbasin MC11				
a. Pump Station[2]	1	ls	4,400.00	4,400
b. Detention Pond[4]	1	ls	4,200.00	4,200
6. Subbasin MC20				
a. Pump Station[2]	1	ls	14,500.00	14,500
b. Detention Pond[4]	1	ls	15,800.00	15,800
7. Subbasin MC71				
a. Pump Station[2]	1	ls	1,700.00	1,700
b. Detention Pond[4]	1	ls	1,500.00	1,500
8. Subbasin MC80				
a. Pump Station[2]	1	ls	13,400.00	13,400
b. Detention Pond[4]	1	ls	17,100.00	17,100
9. Subbasin NC10				
a. Pump Station[2]	1	ls	11,300.00	11,300
b. Detention Pond[4]	1	ls	11,500.00	11,500
10 Subbasin NC20				
a. Pump Station[2]	1	ls	2,800.00	2,800
b. Detention Pond[4]	1	ls	3,200.00	3,200
11 Subbasin SC10				
a. Pump Station[2]	1	ls	11,800.00	11,800
b. Detention Pond[4]	1	ls	11,700.00	11,700
TOTAL				336,000

[1]Costs are based upon 2000 price levels.

[2]Annual operation and maintenance costs for the Main Drain Pump Station and the proposed subbasin pump stations are based upon one percent of the total construction and land acquisition cost for each facility including contingencies.

[3]Annual operation and maintenance costs for the existing ponds and pump stations within Subbasin MC30, Subbasin MC50, and Subbasin MC60 are not included.

[4]Annual operation and maintenance costs for the proposed detention ponds are based upon one-half percent of the total construction cost and land acquisition for each facility including contingencies.

XV. EVALUATION OF DRAINAGE IMPACT FEES

The common drainage facilities and subbasin-specific drainage facilities described in the Preferred Drainage Plan provide drainage and flood protection for the Southport area. The cost of the drainage facilities for the Preferred Drainage Plan was allocated to lands that receive benefit, excluding existing development. The resulting drainage impact fees for new development were evaluated.

For the purpose of allocating drainage facility costs and evaluating drainage impact fees, existing development is defined as development that exists in the 2000 Condition, excluding SBP and SIP (Gainsborough and the Classics).

Development agreements with the City are in place for projects within Subbasin MC60. The existing development agreements address drainage impact fees. A report entitled, "Southport Business Park Project and Bridgeway Island Project -- Drainage Impact and Fee Analysis," prepared by B&A, dated April 17, 2001, identifies drainage impact fees for Subbasin MC60 at $23,265,132. The portion of this fee committed toward funding common drainage facilities within Southport, is $1,591,665.

The City indicated funds are not available as a result of drainage development impact fees generated from development between 1995 and 2000, excluding projects within Subbasin MC60, Gateway South, and Newport Estates.

A. EXEMPT LAND

Public parks, open space, and agricultural lands are exempt from paying drainage impact fees. The allocated cost for subbasin-specific drainage facilities of these lands will be distributed to development on a per acre basis, except within Subbasin MC60. Development within Subbasin MC60 will fund all costs allocated to exempt lands within Subbasin MC60, and will not fund any portion of costs allocated to exempt lands outside of Subbasin MC60.

Subbasin MC30 has an existing detention pond and pump station. Development within Subbasin MC30 will fund all costs allocated to exempt lands within Subbasin MC30.

The total cost of subbasin-specific drainage facilities allocated to exempt lands, is $2,098,417. The total area of nonexempt lands in Southport, excluding existing development and Subbasin MC60, is 3,544 acres. Therefore, the Exempt Land Cost Drainage Fee is $592 per acre. This fee shall be collected for development of all nonexempt lands, excluding Subbasin MC60. The cost allocations for exempt lands are presented in Appendix C (Table C-11).

B. COMMON DRAINAGE FACILITIES COST ALLOCATION

Based upon the benefit received, the cost of the common drainage facilities was allocated to nonexempt lands, excluding existing development. The cost allocations are calculated on a dwelling unit equivalent (DUE) basis. DUE factors were established for each land use type. The total proposed DUEs were calculated by multiplying the area by the DUE factor for each land use type. Adding the total DUEs for each land use type results in the total proposed DUEs for Southport. The total cost of the common drainage facilities ($18,557,000) less the contribution from Subbasin MC60 ($1,591,665) divided by the total proposed DUEs (16,852) results in a cost of $1,007, per DUE. Presented in Appendix C (Table C-2) are the allocation of benefits by land use for common drainage facilities.

For residential land uses, excluding High-Density Residential and High Rise Residential, the DUE factor is based upon the average density included in the report entitled, "Draft City of West Sacramento Southport Framework Plan Preliminary Financing Plan," prepared by Economic and Planning Systems, dated October 17, 1994. For nonresidential, High-Density Residential, and High Rise Residential, the DUE factor is based upon the ratio of the runoff coefficients to DUEs for the average of the Low-Density Residential and Medium-Density Residential values and Commercial values. The runoff coefficients reflect hydrologic soil Group C and were obtained from the report entitled, "The Draft Storm Drainage Design Standards, Section 4.11," prepared by B&A, dated October 30, 1995. The runoff coefficients

for Low-Density Residential, Medium-Density Residential, and Commercial, are 0.45, 0.51, and 0.84, respectively. The average of the Low-Density Residential and Medium-Density Residential runoff coefficients is 0.48. The ratio of the Commercial runoff coefficient to the average runoff coefficient of Low-Density Residential and Medium-Density Residential is 1.75. The average DUE factors for Low-Density Residential (4.0) and Medium-Density Residential (7.0) is 5.5. Multiplying the runoff coefficient ratio of 1.75 by the average DUE factor of 5.5 results in a Commercial DUE factor of approximately 10.

C. SUBBASIN-SPECIFIC DRAINAGE FACILITIES COST ALLOCATION

Based upon the benefit received, the costs of the subbasin-specific drainage facilities for the Preferred Drainage Plan are allocated to nonexempt lands, excluding existing development, based upon the benefit received. Benefits are based upon contribution to storm runoff for each land use type.

The subbasin-specific drainage facilities costs are not allocated to rural lands within subbasins that are primarily urban and include drainage facilities typical for urban development. Although the rural lands may receive benefit from the subbasin-specific drainage facilities, the benefits are incidental.

The contribution to runoff was based upon the runoff coefficients for the Rational Method. The Rational Method is used for estimating the rate of storm water runoff. The runoff coefficients reflect hydrologic soil Group C and were obtained from the report entitled, "Draft Storm Drainage Design Standards, Section 4.11." The runoff coefficient, which is dimensionless, was used to reflect the runoff unit per acre associated with each land use. The runoff units per acre were multiplied by the area to obtain the total runoff units for each land use. The weighted benefit received by each land use type within a subbasin was computed by taking the total runoff units for a particular land use type as a percentage of the total runoff units within the subbasin.

The cost allocation by land use for subbasin-specific drainage facilities for each urban subbasin, excluding Subbasin MC30, Subbasin 50, and Subbasin MC60, is presented in Appendix C (Table C-3 through Table C-10).

D. DRAINAGE IMPACT FEES FOR NEW DEVELOPMENT

The cost of the proposed drainage facilities allocated for new development will be funded by drainage impact fees. The drainage impact fees have three components:

- Common Drainage Facilities
- Subbasin-Specific Drainage Facilities
- Exempt Land Drainage Facilities

The cost allocation summary by subbasin is presented on Table 6. The cost allocation is divided into the three components.

The drainage fees for each subbasin are presented in Appendix C (Table C-12 through Table C-39). Presented on Table 7 are drainage fees by land use type for all subbasins. In some cases, subbasins that consist of primarily rural lands include urban lands, and the drainage fees for these urban lands are considerably less than the same land use type within subbasins that are proposed to have significant drainage improvements. The variations in the drainage fees are consistent with the level of flood protection afforded the properties.

To compare drainage fees per dwelling unit or per square foot, assumptions regarding buildout densities must be made. This report estimated average, high, and low densities for residential lands based upon the report entitled, "Draft City of West Sacramento Southport Framework Plan Preliminary Financing Plan," and the "Draft EIR for the Southport Framework Plan," prepared by Willdan Associates, dated March 1994. The estimated floor to area ratio (FAR) was based upon the "Draft City of West Sacramento Southport Framework Plan Preliminary Financing Plan."

TABLE 6

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

COST ALLOCATION SUMMARY

Subbasin	Cost Allocation, $			
	Common Drainage Facilities	Subbasin-Specific Drainage Facilities1	Exempt Land Drainage Facilities	Total Drainage Facilities
MC10	4,220,034	11,692,949	436,222	16,349,204
MC11	909,253	2,116,168	53,481	3,078,902
MC20	3,383,525	6,182,273	199,015	9,764,813
MC30	534,267	0	36,830	571,097
MC50	0	0	0	0
MC60	1,591,665	0	0	1,591,665
MC70	107,914	0	128,676	236,590
MC71	120,804	461,345	17,764	599,913
MC72	0	0	0	0
MC73	26,355	0	30,483	56,838
MC74	28,284	0	41,591	69,875
MC75	9,991	0	14,691	24,681
MC76	0	0	0	0
MC80	2,761,464	7,437,034	301,737	10,500,235
MC81	102,611	0	150,886	253,497
MC90	0	0	0	0
MC91	0	0	0	0
MC92	0	0	0	0
MC100	0	0	0	0
MC110	0	0	0	0
NC10	2,129,396	5,730,317	236,467	8,096,180
NC11	35,678	0	26,231	61,909
NC20	359,976	1,151,905	45,162	1,557,043
NC21	0	0	0	0
NC22	65,548	0	48,193	113,742
NC23	185,257	0	46,458	231,716
SC10	1,944,052	5,306,593	241,275	7,491,920
SC11	40,924	0	43,255	84,179
TOTAL	18,557,000	40,078,583	2,098,417	60,734,000

[1]Costs for subbasin-specific drainage facilities for Subbasin MC30 and Subbasin MC60 are not included.

TABLE 7

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES BY LAND USE TYPE FOR ALL SUBBASINS

Land Use	Total Drainage Fee Per Acre, $																											Average	Minimum	Maximum
	Subbasin																													
	MC10	MC11	MC20	MC30[1]	MC50	MC60[2]	MC70	MC71	MC72	MC73	MC74	MC75	MC76	MC80	MC81	MC90	MC91	MC92	MC100	MC110	NC10	NC11	NC20	NC21	NC22	NC23	SC10	SC11	Subbasins	Subbasins	Subbasins
PROPOSED DEVELOPMENT																														
Rural Estates (RE)							995			995	995	995			995													995	995	995	995
Rural Residential (RR)	1,397						1,397			1,397											1,397	1,397			1,397	1,397		1,397	1,397	1,397	1,397
Low Density Residential (LR)	20,058							19,997						17,869							18,299		19,274				16,860		18,726	16,860	20,058
Medium Density Residential (MR)	25,136			7,639										22,656							23,143		24,248				21,512		20,722	7,639	25,136
High Density Residential (HR)	35,018			10,659										31,564							32,243						29,973		27,892	10,659	35,018
High Rise Residential (HRR)																														
Neighborhood Commercial (NC)	39,478		29,739				10,659							35,392							36,195					10,659	33,509		27,948	10,659	39,478
Community Comercial (CC)				10,659																									10,659	10,659	10,659
Water Related Commercial (WRC)																														
General Commercial (GC)		34,089																											34,089	34,089	34,089
Business Park (BP)			29,739																										29,739	29,739	29,739
Mixed Use (MU)	32,617																												32,617	32,617	32,617
Riverfront Mixed Use (RMU)	32,617	34,089	25,196																										30,634	25,196	34,089
Light Industrial (LI)			28,831																										28,831	28,831	28,831
Heavy Industrial (HI)																														
Water Related Industrial (WRI)	38,106		28,831																										33,468	28,831	38,106
Public/Quasi-Public (PQP)	27,538													24,717							25,271						23,417		25,236	23,417	27,538
Recreation and Park (RP)	0		0											0				0			0						0		0	0	0
Open Space (OS)	0	0	0	0				0		0	0			0							0		0				0		0	0	0

[1]The subbasin-specific drainage facilities costs for Subbasin MC30 are not specified in this report. Therefore, the total drainage fee for Subbasin MC30 does not reflect the subbasin-specific drainage facilities portion of the fee.

[2]The subbasin-specific drainage facilities costs for Subbasin MC60 are not specified in this report. Subbasin MC60 is not participating in the spread of costs allocated for exempt land. Existing development agreements for Subbasin MC60 establish the cost allocation for common drainage facilities. Therefore, this table does not include a cost per acre for Subbasin MC60.

The drainage fees for Rural Estates and Rural Residential are within the same order of magnitude as Low-Density Residential on a dwelling unit basis. Although the Rural Estates and Rural Residential drainage fee per acre is significantly less than Low-Density Residential, the drainage fee per estimated dwelling unit for these land uses is relatively comparable.

Presented on Table 8 is a comparison of drainage fees by land use under average-, high-, and low-density assumptions. Over the range of subbasins, the minimum, average, and maximum total drainage fee per dwelling unit or per square foot is presented.

E. PHASING CASH FLOW FUNDING SHORTFALLS

Drainage facilities will be identified for each stage of development within Southport. As previously described in this report, two phasing scenarios were established depicting probable increments of development based upon projects currently proposed or under construction. Actual development phasing may differ from that included in this report.

As presented earlier in this report, the Opinions of Probable Cost for drainage facilities required for Phase 1 and Phase 2 are $2,273,000 and $29,287,000, respectively. The estimated drainage fees for Phase 1 and Phase 2 are $6,228,911 and $10,890,453, respectively. Presented on Table 9 is a summary of the drainage fees for Phase 1 and Phase 2. These numbers do not include the additional $1,591,665, which Subbasin MC60 is committed to contributing toward the common drainage facilities.

The sum of Subbasin MC60's contribution ($1,591,665) and the drainage fees derived from Phase 1 development amount to $7,820,576. This amount exceeds the cost of Phase 1 drainage facilities by $5,547,576.

TABLE 8

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEE COMPARISON

Land Use	Assumptions[1]				Total Drainage Fee Per Dwelling Unit (DU) or Square Foot (SF)								
					(Assuming Average Densities)			(Assuming High Densities)			(Assuming Low Densities)		
	FAR	Average Density (DU/AC or SF/AC)	High Density (DU/AC or SF/AC)	Low Density (DU/AC or SF/AC)	Average Subbasins	Minimum Subbasins	Maximum Subbasins	Average Subbasins	Minimum Subbasins	Maximum Subbasins	Average Subbasins	Minimum Subbasins	Maximum Subbasins
PROPOSED DEVELOPMENT													
Rural Estates (RE)		0.4	0.5	0.1	2,487	2,487	2,487	1,990	1,990	1,990	9,948	9,948	9,948
Rural Residential (RR)		0.8	1	0.5	1,747	1,747	1,747	1,397	1,397	1,397	2,795	2,795	2,795
Low Density Residential (LR)		4	5	1.1	4,682	4,215	5,014	3,745	3,372	4,012	17,024	15,327	18,234
Medium Density Residential (MR)		7	12	5.1	2,960	1,091	3,591	1,727	637	2,095	4,063	1,498	4,929
High Density Residential (HR)		18	25	12.1	1,550	592	1,945	1,116	426	1,401	2,305	881	2,894
High Rise Residential (HRR)		30	50	25.1	0	0	0	0	0	0	0	0	0
Neighborhood Commercial (NC)	0.25	10890	10890	10890	3	1	4	3	1	4	3	1	4
Community Comercial (CC)	0.25	10890	10890	10890	1	1	1	1	1	1	1	1	1
Water Related Comunercial (WRC)	0.20	8712	8712	8712	0	0	0	0	0	0	0	0	0
General Commercial (GC)	0.15	6534	6534	6534	5	5	5	5	5	5	5	5	5
Business Park (BP)	0.30	13068	13068	13068	2	2	2	2	2	2	2	2	2
Mixed Use (MU)	0.11	4791.6	4791.6	4791.6	7	7	7	7	7	7	7	7	7
Riverfront Mixed Use (RMU)	0.10	4356	4356	4356	7	6	8	7	6	8	7	6	8
Light Industrial (LI)	0.35	15246	15246	15246	2	2	2	2	2	2	2	2	2
Heavy Industrial (HI)	0.25	10890	10890	10890	0	0	0	0	0	0	0	0	0
Water Related Industrial (WRI)	0.20	8712	8712	8712	4	3	4	4	3	4	4	3	4
Public/Quasi-Public (PQP)													
Recreation and Park (RP)													
Open Space (OS)													

[1]FAR is the Floor to Area Ratio based upon the "Draft City of West Sacramento Southport Framework Plan Preliminary Financing Plan," dated October 17, 1994. Average density is based upon the "Draft City of West Sacramento Southport Framework Plan Preliminary Financing Plan." High and low densities are based upon the "Draft EIR for the Southport Framework Plan," dated March 1994.

TABLE 9

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUMMARY OF DRAINAGE FEES
PREFERRED DRAINAGE PLAN
PHASE 1 AND PHASE 2

	Phase 1 Drainage Fees,$[1]			
	Common Drainage Facilities	Subbasin-Specific Drainage Facilities	Exempt Land Drainage Facilities	Total
MC10 - Phase 1	451,002	1,729,143	66,318	2,246,463
MC20 -Phase 1	1,167,774	2,146,074	68,687	3,382,535
MC71	120,804	461,345	17,764	599,913
TOTAL	1,739,581	4,336,561	152,769	6,228,911
	Phase 2 Drainage Fees,$[1]			
	Common Drainage Facilities	Subbasin-Specific Drainage Facilities	Exempt Land Drainage Facilities	Total
MC10 - Phase 2	1,556,361	4,249,436	144,480	5,950,277
MC80	1,305,692	3,490,005	144,480	4,940,176
TOTAL	2,862,053	7,739,441	288,959	10,890,453

[1]This table does not include fees for Subbasin MC60 or any other development in the 2000 Condition or Base Condition (1995).

The drainage fees derived from Phase 2 development are estimated at $10,890,453. The sum of the drainage fees from Phase 2 development and the fees from Phase 1 development, in excess of Phase 1 costs, amount to $16,438,029. This amount is $12,848,971 less than the cost of the Phase 2 drainage facilities.

It is important to note that, at full buildout of the Southport area, the cost of the master planned facilities will be funded by drainage fees. The funding deficit for Phase 2 is a phasing issue.

XVI. SUMMARY OF FINDINGS AND RECOMMENDATIONS

The drainage facilities identified in the Preferred Drainage Plan address the changes that have taken place since preparing the 1995 Southport DMP. The updated drainage principles identified by the City are incorporated into the DMP Update. In preparing the DMP Update, B&A formulated particular findings and recommendations. B&A's findings and recommendations are presented below.

A. FINDINGS

1. The City's revised approach to dealing with storm drainage in rural areas significantly alters the Southport master planned drainage facilities.

2. Measures are required to mitigate drainage and flood impacts of the 2000 Condition.

3. The Preferred Drainage Plan is the most cost-effective plan and accomplishes the City's stated objectives.

4. The Opinion of Probable Cost for the common drainage facilities and subbasin-specific drainage facilities for the Preferred Drainage Plan, is $60,734,000. The cost of the common drainage facilities, $18,557,000, is allocated to approximately 4,573 acres of nonexempt rural and urban lands, excluding existing development. The portion of the cost of the subbasin-specific drainage facilities for nonexempt lands, $40,078,583, is allocated to approximately 2,586 acres of nonexempt urban lands, excluding existing development. The cost of the subbasin-specific drainage facilities for exempt lands, $2,098,417, is allocated to approximately 3,544 acres of nonexempt rural and urban lands, excluding existing development and Subbasin MC60.

5. Excluding cost allocations to existing development results in an increase in drainage fees for new development.

6. Drainage impact fees for each dwelling unit are within the same order of magnitude among Rural Residential, Rural Estates, and Low-Density Residential.

7. Phase 1 development does not require improvements to common drainage facilities. Phase 2 development requires significant improvements to common drainage facilities. The phasing plan provided for this analysis results in a significant deficit in fees to fund drainage facilities required for Phase 2 development. However, drainage fees derived from development of the remaining areas in Southport will provide funding for all the proposed drainage facilities.

B. RECOMMENDATIONS

1. The mitigation measures identified for the 2000 Condition should be implemented prior to eliminating the Marshall Drain.

2. The Preferred Drainage Plan, Alternative C, should be implemented as development progresses within Southport.

3. Detailed hydraulic and biologic analyses should be developed in conjunction with operational guidelines to determine "bench" elevations and grades to establish wetland areas along the drains.

4. A financing strategy and/or modified phasing plan should be developed to address the funding deficit in drainage fees for Phase 2. Postponing development within Subbasin MC80 may be the most economically feasible plan.

XVII. REFERENCES

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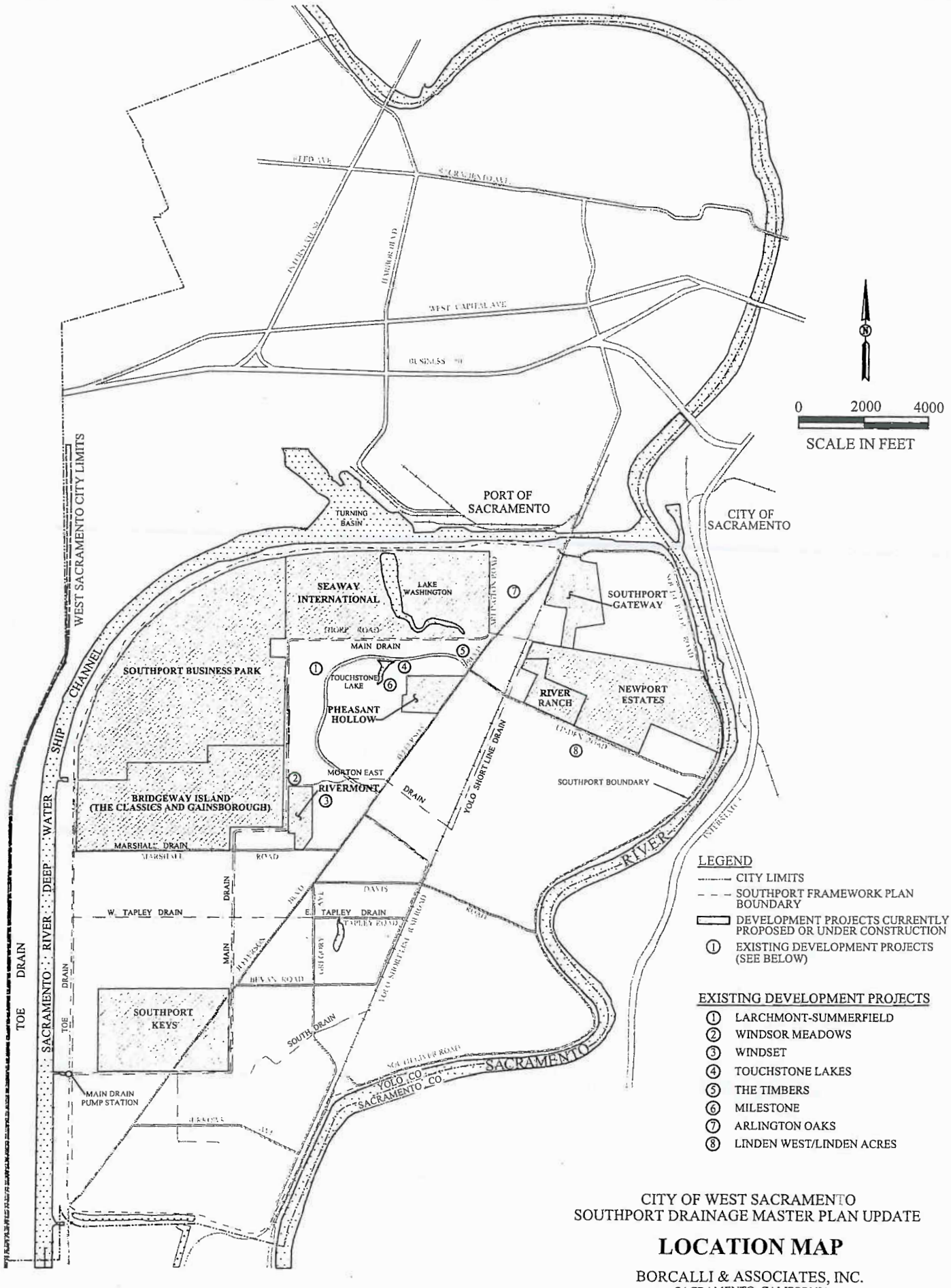
Figures



CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

LOCATION MAP

BORCALLI & ASSOCIATES, INC.
SACRAMENTO, CALIFORNIA

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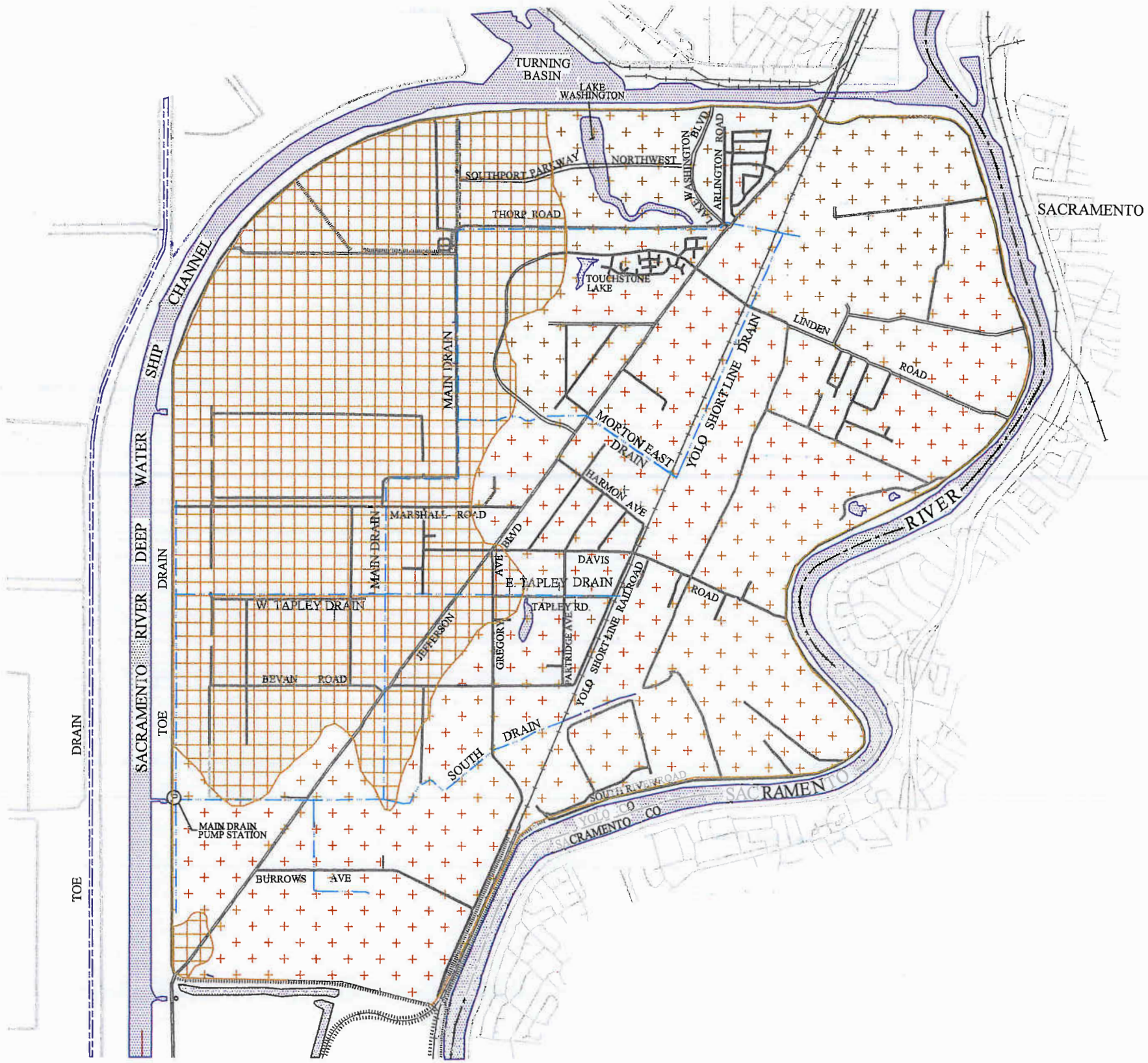
FIGURE 1



LEGEND

- ROADWAY
- STATE ROUTE
- RAILROAD
- EXISTING LEVEE/BERM
- EXISTING DRAIN
- WATER
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D

SOURCE

U.S. Department of Agriculture Soil Conservation Service
"Soil Survey of Yolo County, California", June 1972.

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SCALE IN FEET

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

HYDROLOGIC SOIL GROUPS

BORCALLI & ASSOCIATES, INC.
SACRAMENTO, CALIFORNIA

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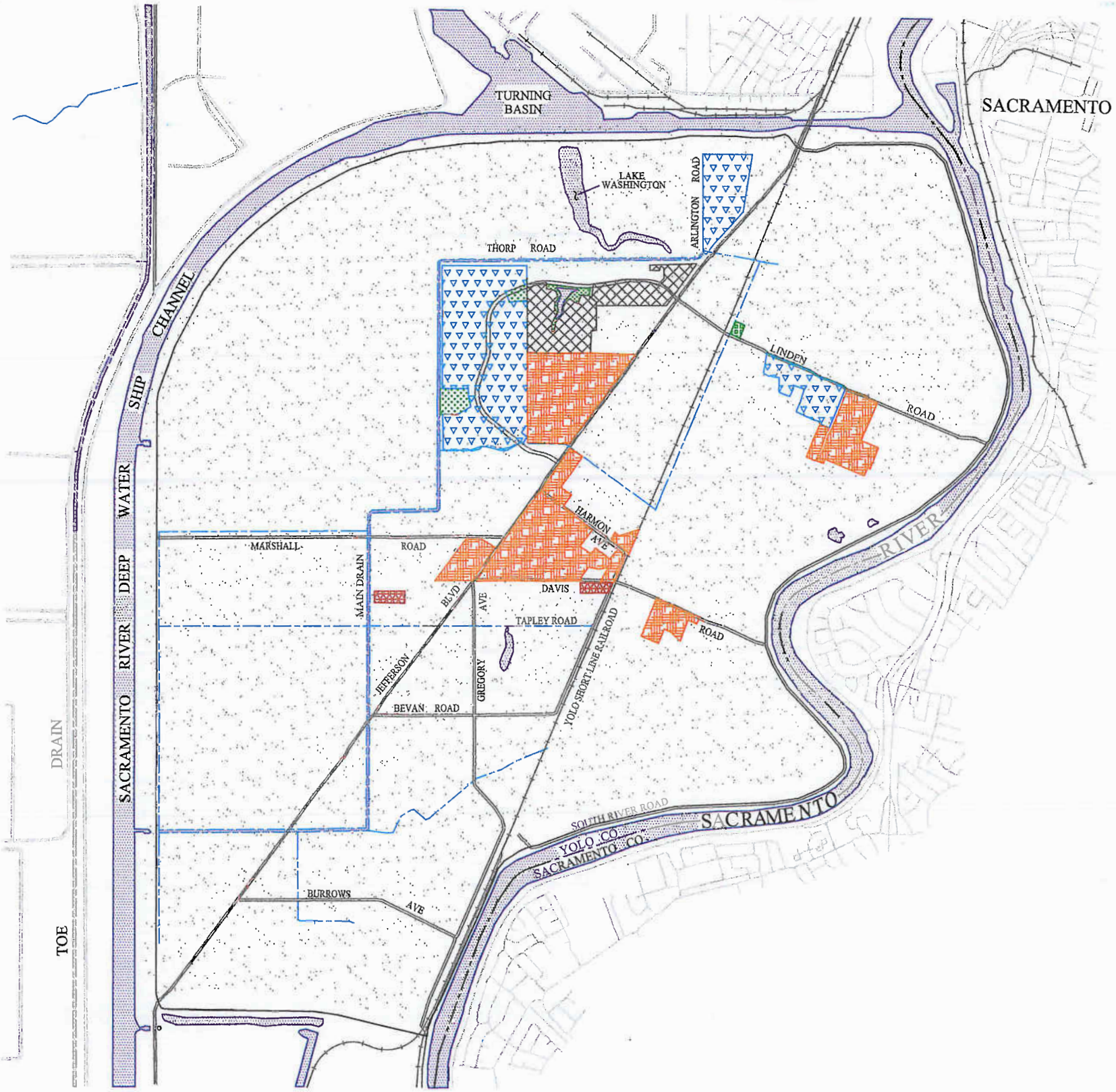
FIGURE 2



LEGEND

- EXISTING DRAIN
- ROADWAY
- STATE ROUTE
- RAILROAD
- AGRICULTURE
- RURAL ESTATES
- RURAL RESIDENTIAL
- LOW-DENSITY RESIDENTIAL
- MEDIUM-DENSITY RESIDENTIAL
- RECREATION AND PARKS
- PUBLIC/QUASI-PUBLIC
- WATER

SOURCES

1. City of West Sacramento, "General Plan Land Use Diagram," revised December 30, 1993.
2. City of West Sacramento, Aerial Photograph, July 23, 1993.

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SCALE IN FEET

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

LAND USE
BASE CONDITION (1995)

BORCALLI & ASSOCIATES, INC.
SACRAMENTO, CALIFORNIA

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FIGURE 3

LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- EXISTING LEVEE/BERM
- WATER
- EX10 SUBBASIN NAME
- SUBBASIN OUTFALL
- (P) PUMP STATION

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SCALE IN FEET

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FACILITIES AND SUBBASINS BASE CONDITION (1995)

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SACRAMENTO, CALIFORNIA

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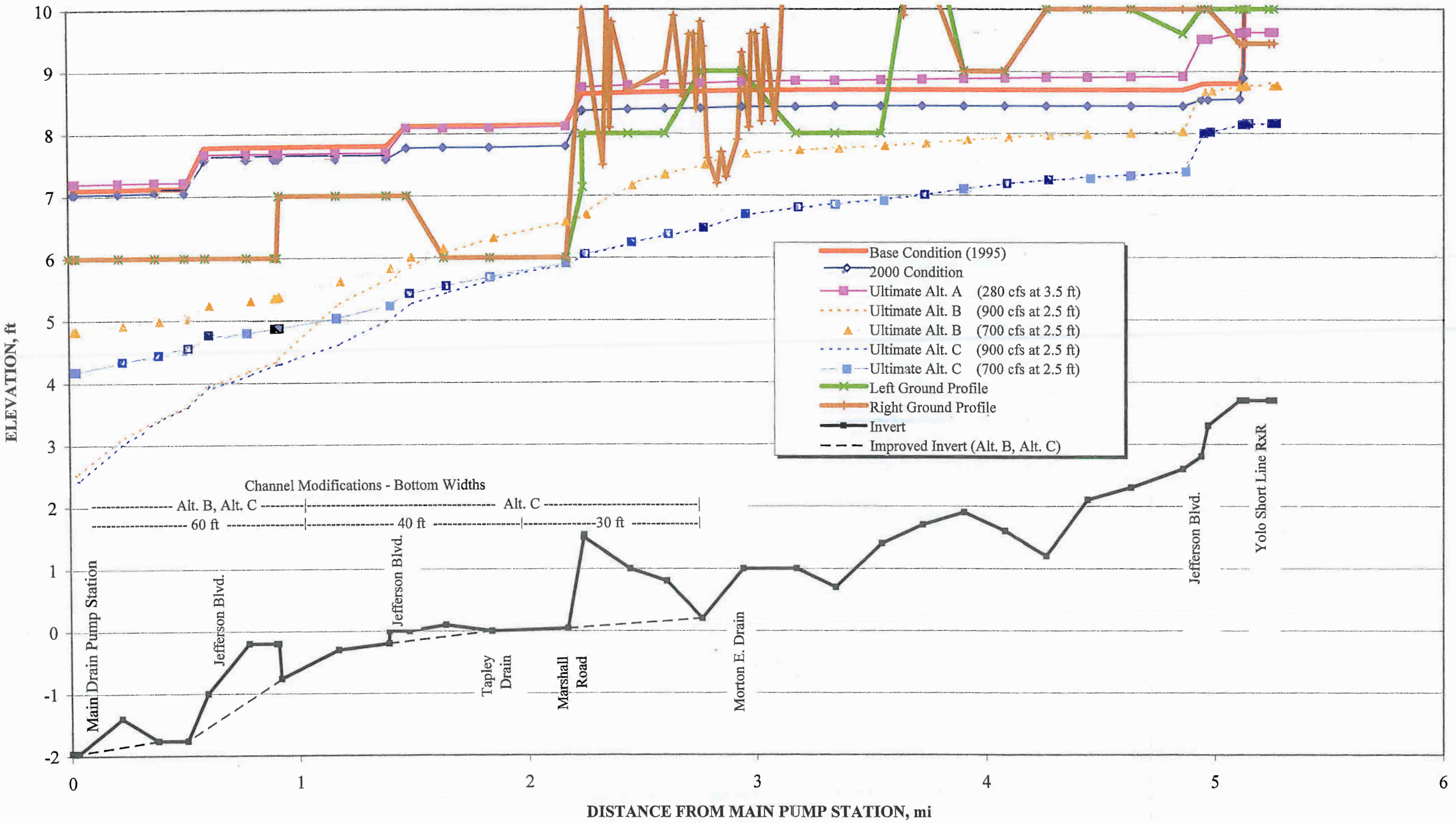
FIGURE 4

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE
DRAIN PROFILES
BASE, 2000, AND ULTIMATE CONDITIONS
MAIN DRAIN MAXIMUM 100-YEAR WATER SURFACE ELEVATIONS

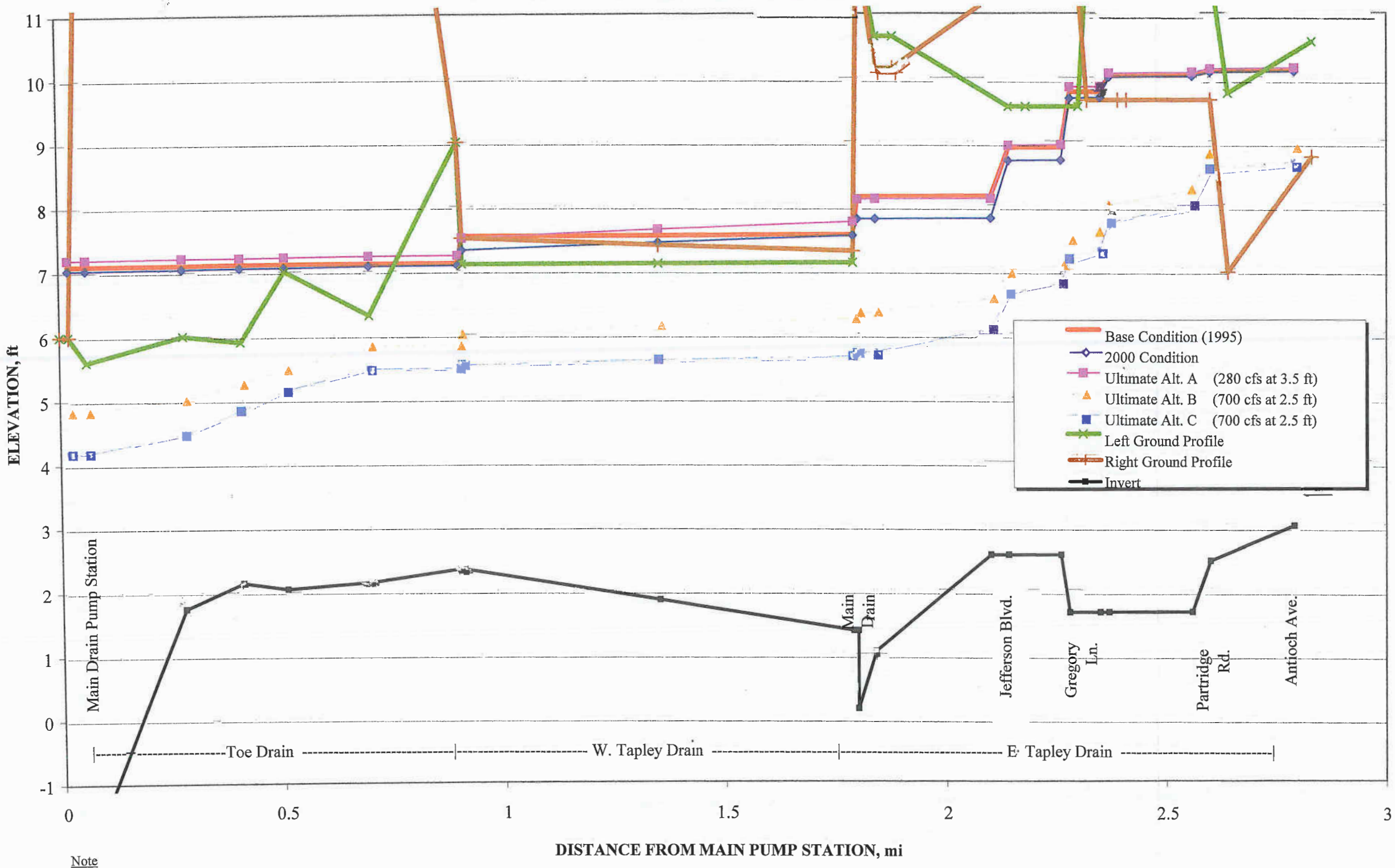


Note
Based upon UNET model of 100-Year, 24-Hour storm event.

Profiles.xls Figure 5-1 Main
Borcalli & Associates, Inc.
Southport Drainage Master Plan Update
May 4, 2001

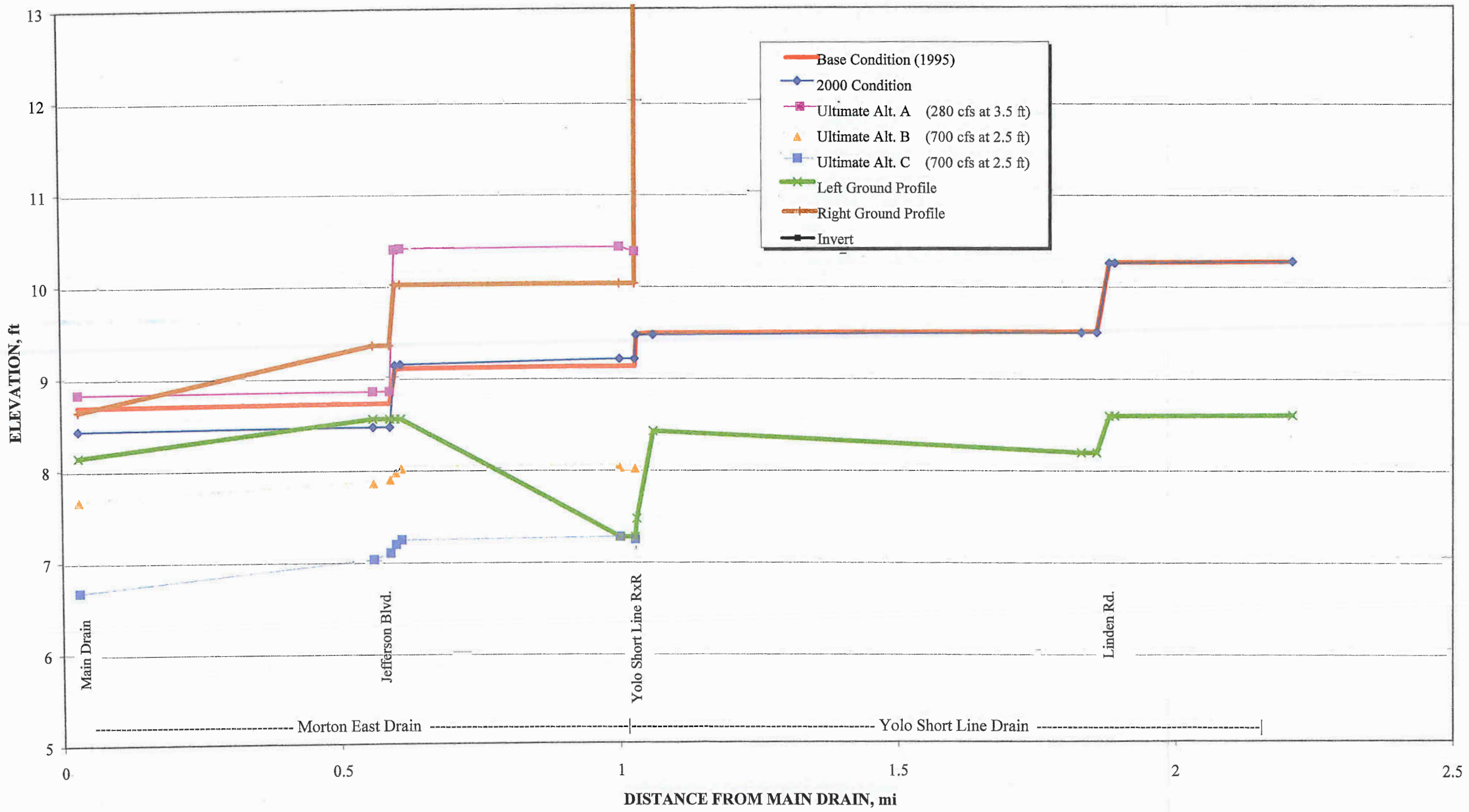
FIGURE 5
SHEET 1 OF 4

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE
DRAIN PROFILES
BASE, 2000, AND ULTIMATE CONDITIONS
TAPLEY DRAIN MAXIMUM 100-YEAR WATER SURFACE ELEVATIONS



Note
Based upon UNET model of 100-Year, 24-Hour storm event.

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE
DRAIN PROFILES
BASE, 2000, AND ULTIMATE CONDITIONS
MORTON E. DRAIN MAXIMUM 100-YEAR WATER SURFACE ELEVATIONS

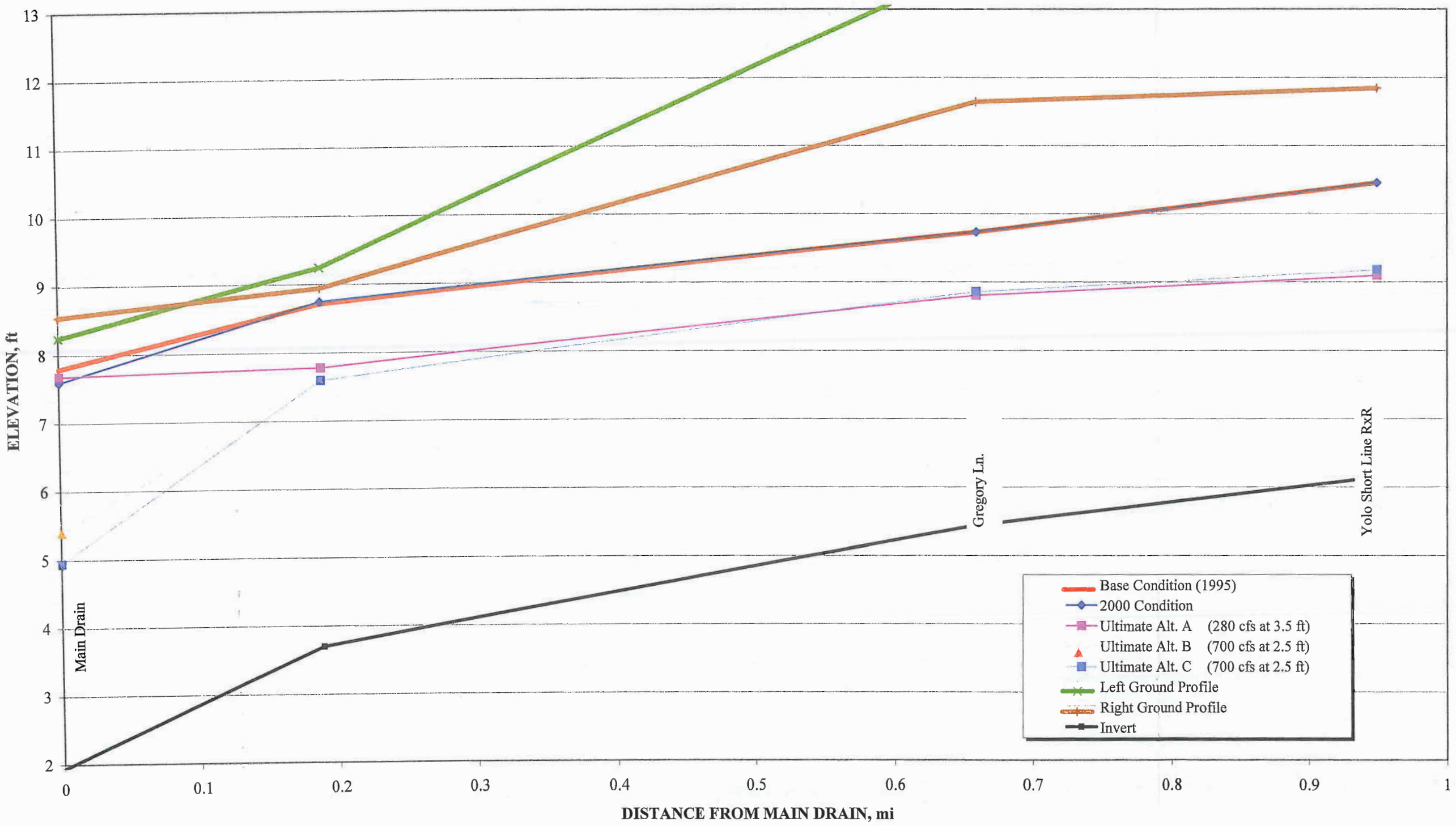


Note
Based upon UNET model of 100-Year, 24-Hour storm event.

Profiles.xls Figure 5-3 Morton
Borcalli & Associates, Inc.
Southport Storm Drainage Master Plan Update
May 4, 2001

FIGURE 5
SHEET 3 OF 4

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE
DRAIN PROFILES
BASE, 2000, AND ULTIMATE CONDITIONS
SOUTH DRAIN MAXIMUM 100-YEAR WATER SURFACE ELEVATIONS



Note
Based upon UNET model of 100-Year, 24-Hour storm event.

Profiles.xls Figure 5-4 South
Borcalli & Associates, Inc.
Southport Drainage Master Plan Update
May 4, 2001

FIGURE 5
SHEET 4 OF 4

LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- AGRICULTURE
- RURAL ESTATES
- RURAL RESIDENTIAL
- LOW-DENSITY RESIDENTIAL
- MEDIUM-DENSITY RESIDENTIAL
- RECREATION AND PARKS
- NEIGHBORHOOD COMMERCIAL
- COMMUNITY COMMERCIAL
- GENERAL COMMERCIAL
- PUBLIC/QUASI-PUBLIC
- WATER
- POST 1995 DEVELOPMENT

SOURCES

1. City of West Sacramento, "General Plan Land Use Diagram," revised December 30, 1993.
2. City of West Sacramento, Aerial Photograph, July 23, 1993.
3. City of West Sacramento, Aerial Photograph, July 17, 1999.

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SCALE IN FEET

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

LAND USE
2000 CONDITION

BORCALLI & ASSOCIATES, INC.
SACRAMENTO, CALIFORNIA

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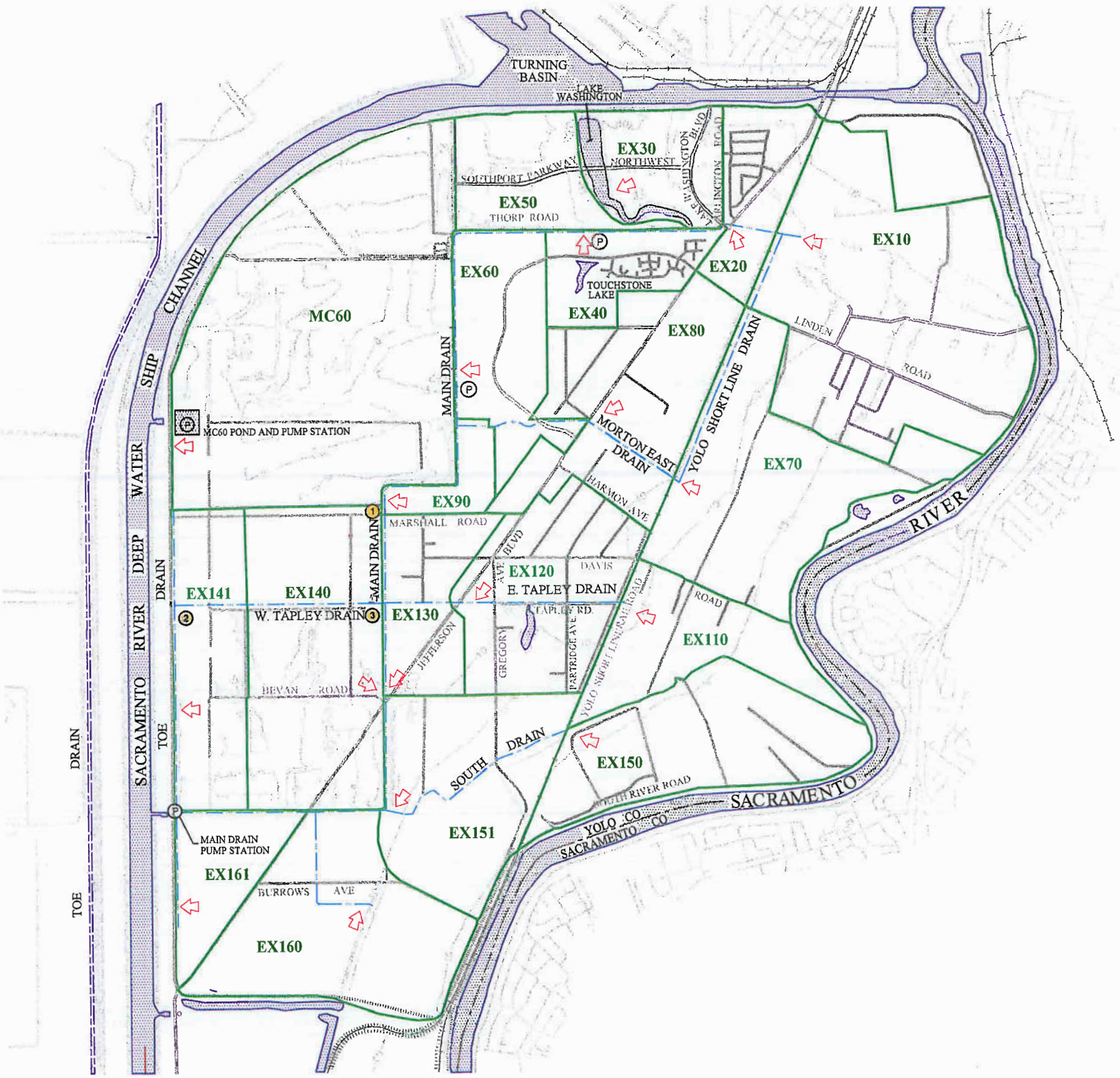
FIGURE 6



LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- EXISTING LEVEE/BERM
- WATER
- EX10 SUBBASIN NAME
- SUBBASIN OUTFALL
- (1) DRAIN CROSSING IMPROVEMENTS (SEE BELOW)
- (P) PUMP STATION

DRAIN CROSSING IMPROVEMENTS

MAIN DRAIN

(1)	MARSHALL	(1-6x8 BOX CULVERT)

W. TAPELY DRAIN

(2)	WEST END NEAR TOE DRAIN	(1-5x8 BOX CULVERT)
(3)	EAST END NEAR MAINDRAIN	(1-5x8 BOX CULVERT)

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SCALE IN FEET

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FACILITIES AND SUBBASINS 2000 CONDITION

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SACRAMENTO, CALIFORNIA

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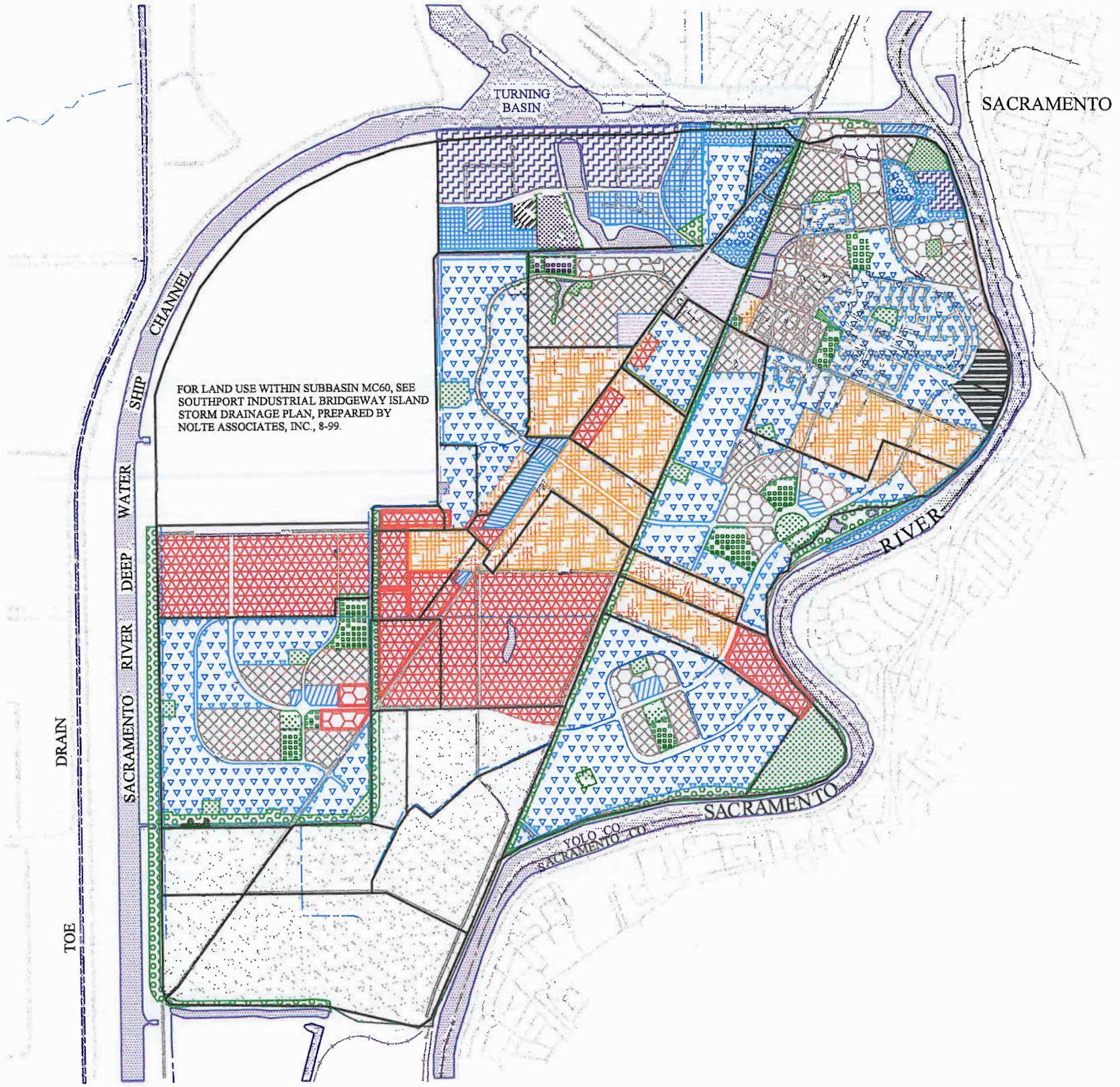
FIGURE 7



LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- AGRICULTURE
- RURAL ESTATES
- RURAL RESIDENTIAL
- LOW-DENSITY RESIDENTIAL
- MEDIUM-DENSITY RESIDENTIAL
- HIGH-DENSITY RESIDENTIAL
- RECREATION AND PARKS
- NEIGHBORHOOD COMMERCIAL
- PUBLIC/QUASI-PUBLIC
- MIXED USE
- WATER
- LIGHT INDUSTRIAL
- HEAVY INDUSTRIAL
- WATER-RELATED INDUSTRIAL
- COMMUNITY COMMERCIAL
- WATER-RELATED COMMERCIAL
- GENERAL COMMERCIAL
- OPEN SPACE
- BUSINESS PARK
- RIVER MIXED USE

SOURCES

1. City of West Sacramento, "General Plan Land Use Diagram," revised 2000.
2. City of West Sacramento, Aerial Photograph, July 23, 1993.
3. City of West Sacramento, Aerial Photograph, July 17, 1999.

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SCALE IN FEET

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

LAND USE
ULTIMATE

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FIGURE 8

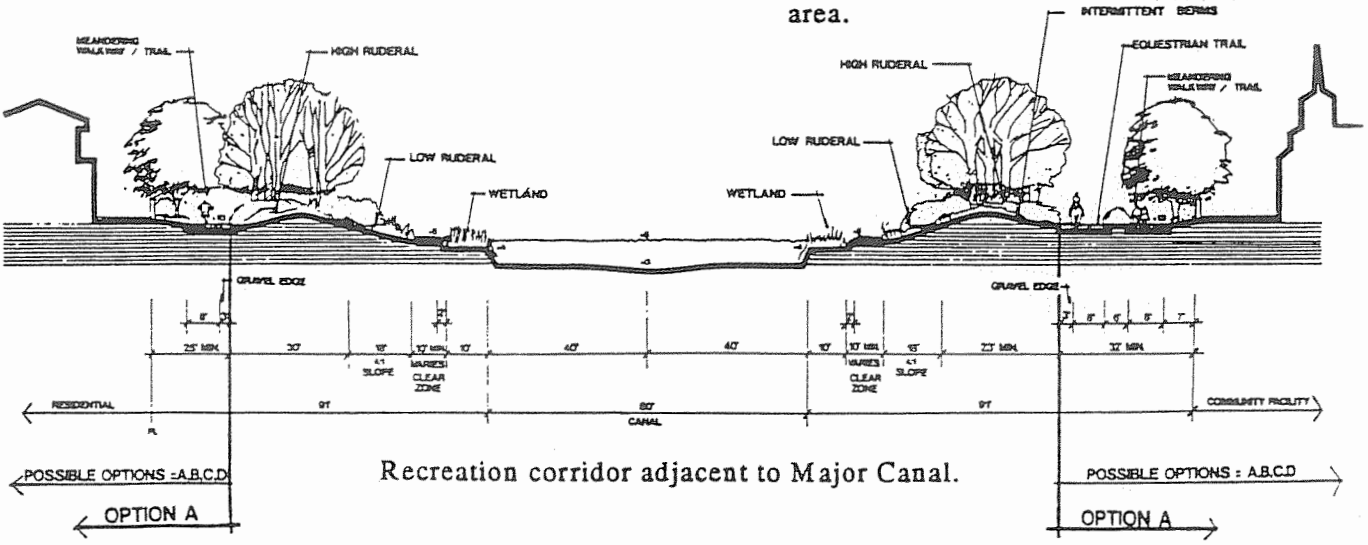
12. RECREATION CORRIDORS

Conformance

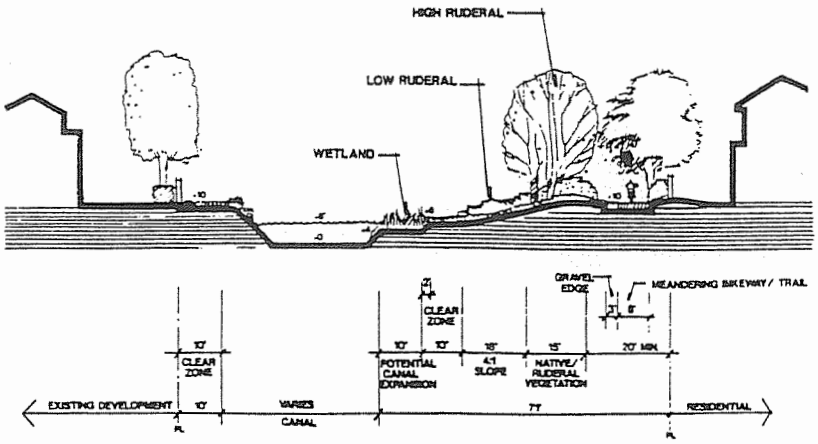
12.1 Recreation corridors are defined as linear public rights-of-way which combine storm water drainage and detention, wildlife habitat and migration, and recreation at pedestrian and bicycle use. Recreation corridors are located along the main canal system, the Yolo Railroad right-of-way, and the Sacramento River and Deep Water Ship Channel levee system. Recreation corridors are indicated on both the Framework Plan map and the City's Parks Master Plan.

Site Plan

12.2 Preliminary design and dimensions shall be per the design criteria cross sections following. Final stormwater detention capaity must be confirmed by the City Engineer and the exact width of the canal will be determined by the Southport Drainage Plan. Regardless of final storm water retention and wildlife habitat requirements, a minimum of 25 feet of pedestrian and bicycle circulation area shall be reserved and improved within the recreation corridor on each side adjacent to a project's development area.



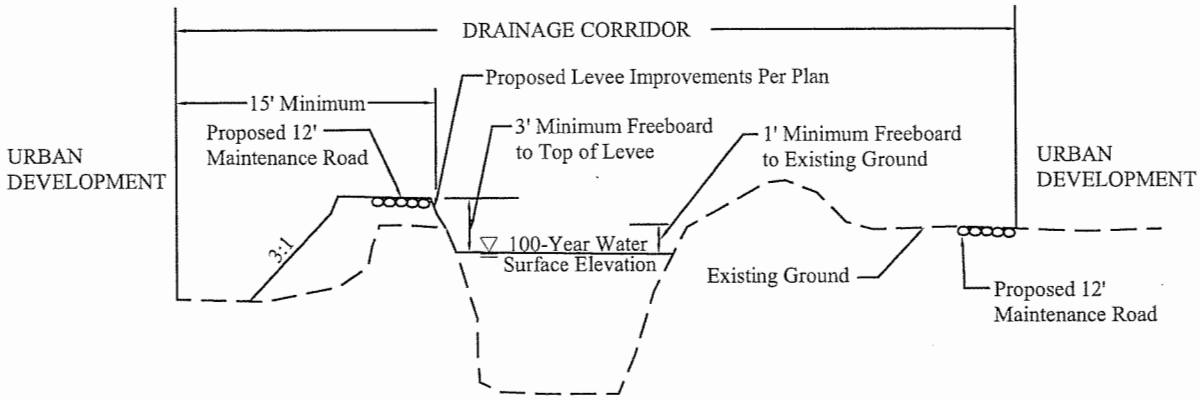
Recreation corridor adjacent to Major Canal.



Recreation corridor adjacent to Secondary Canal.

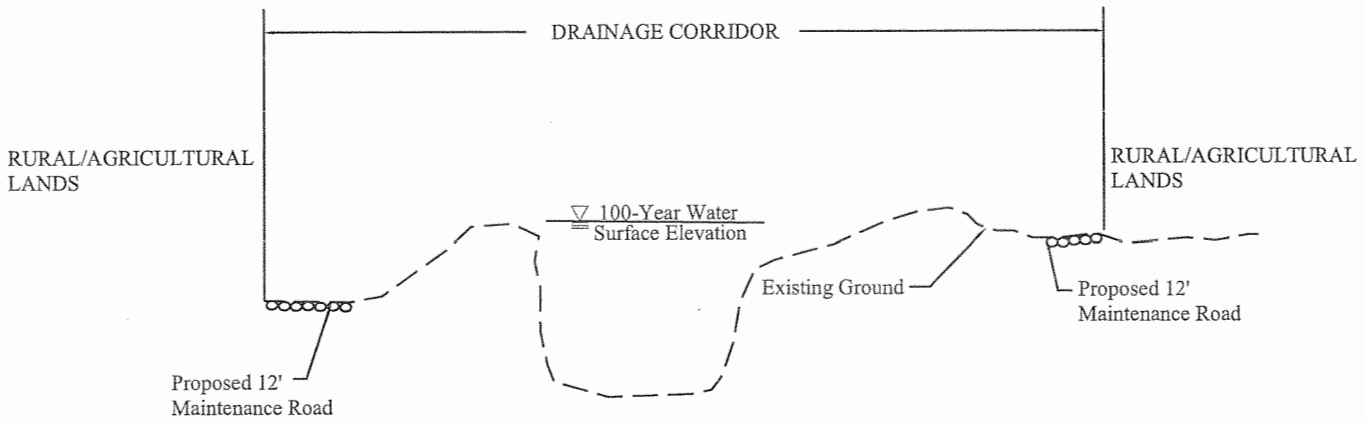
Source: City of West Sacramento, "Design Guidelines, Southport," dated August 5, 1998

FIGURE 9



ADJACENT TO URBAN DEVELOPMENT

NOT TO SCALE



ADJACENT TO RURAL/AGRICULTURAL LANDS

NOT TO SCALE

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE CORRIDOR TYPICAL SECTIONS ALTERNATIVE A

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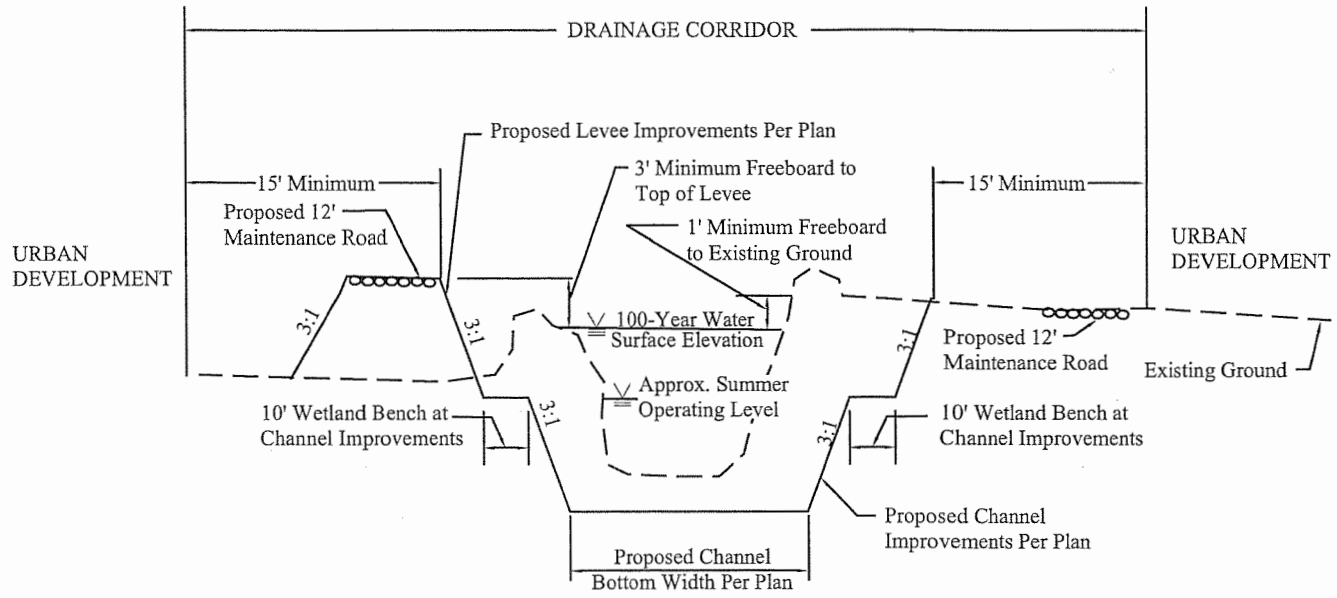
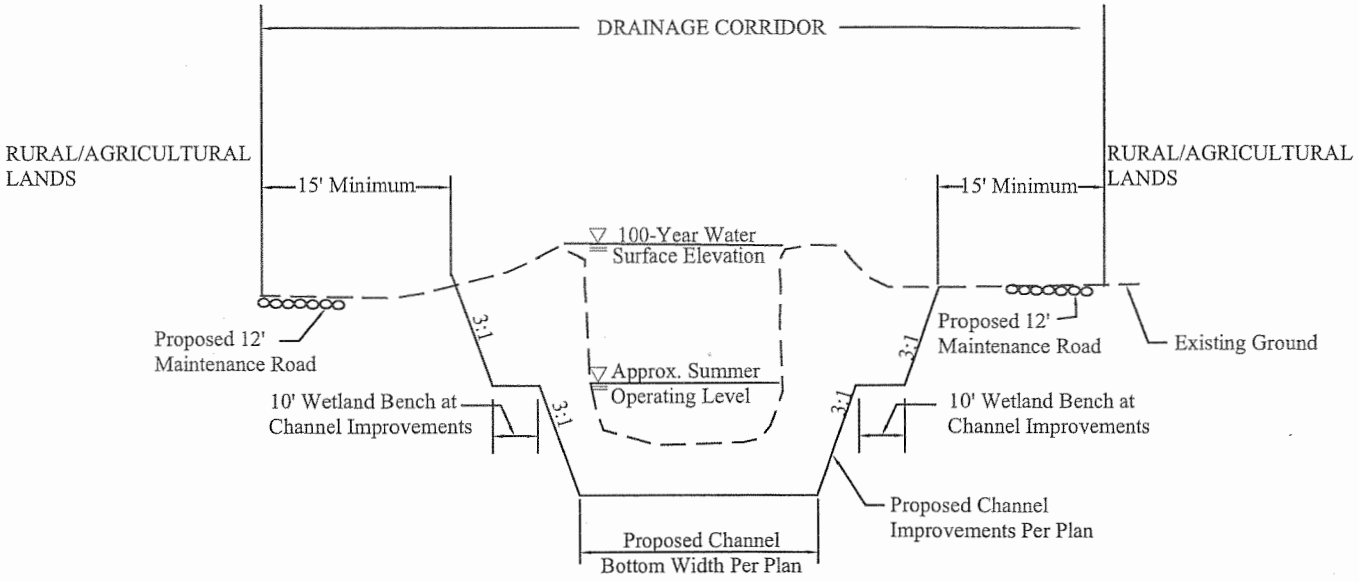
FIGURE 10



ADJACENT TO URBAN DEVELOPMENT

NOT TO SCALE



ADJACENT TO RURAL/AGRICULTURAL LANDS

NOT TO SCALE

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE CORRIDOR TYPICAL SECTIONS ALTERNATIVE B

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SACRAMENTO, CALIFORNIA

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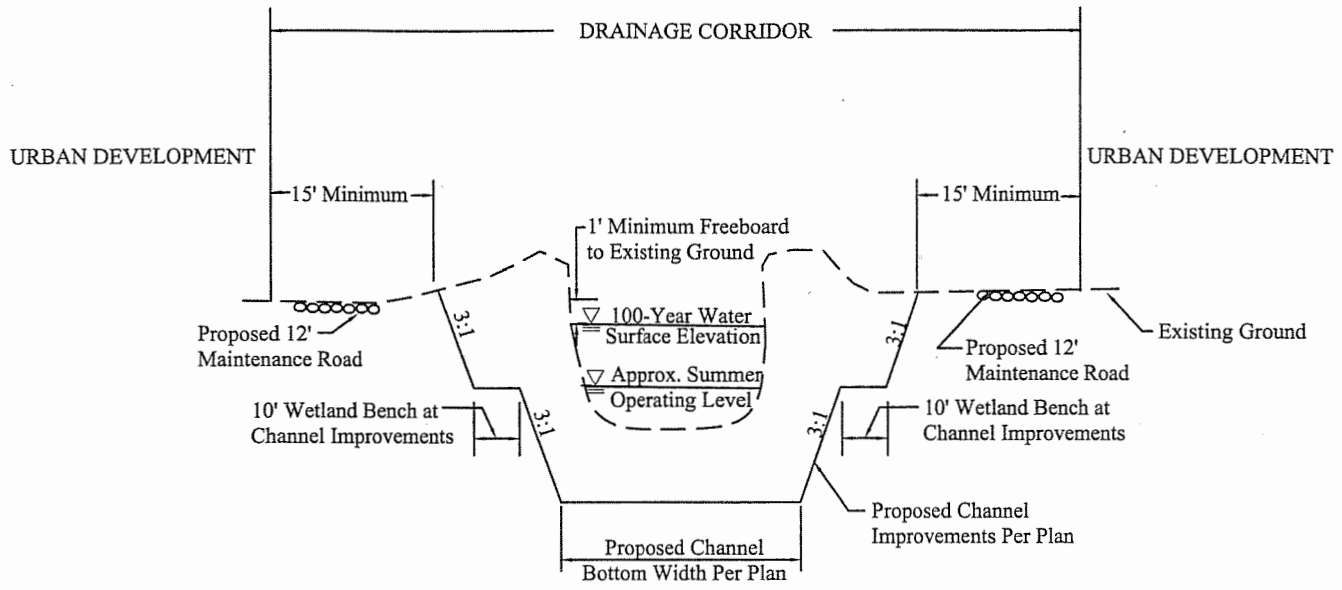
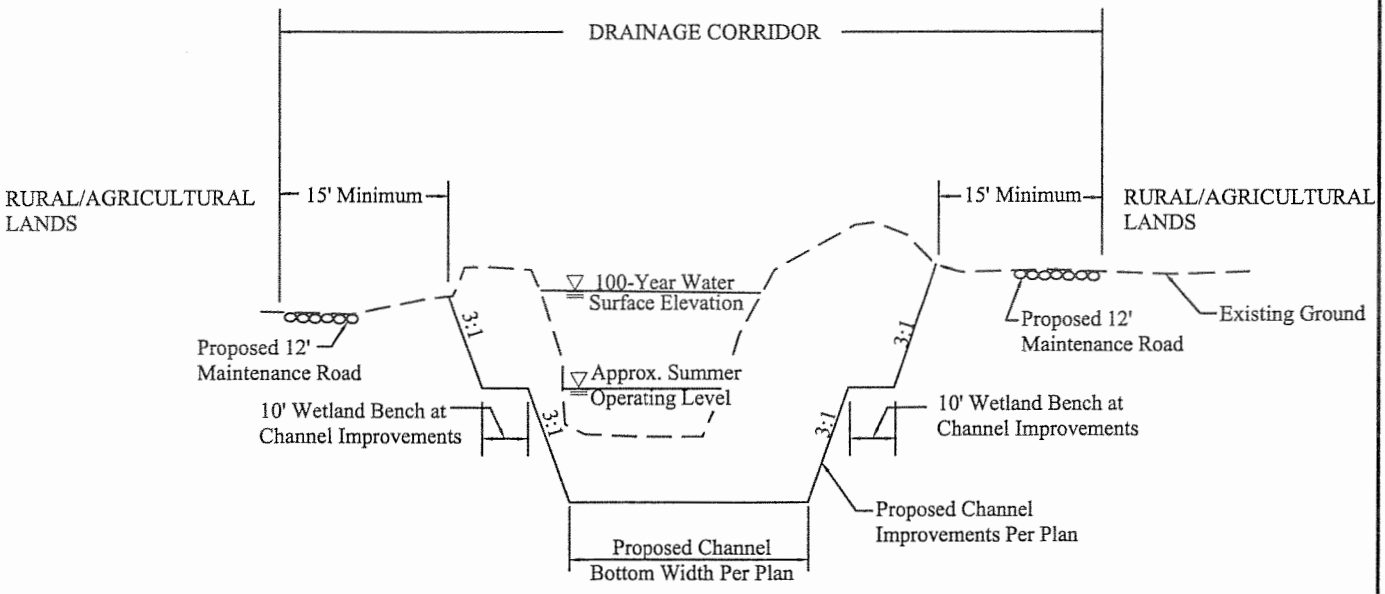
FIGURE 11



ADJACENT TO URBAN DEVELOPMENT

NOT TO SCALE



ADJACENT TO RURAL/AGRICULTURAL LANDS

NOT TO SCALE

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE CORRIDOR TYPICAL SECTIONS ALTERNATIVE C

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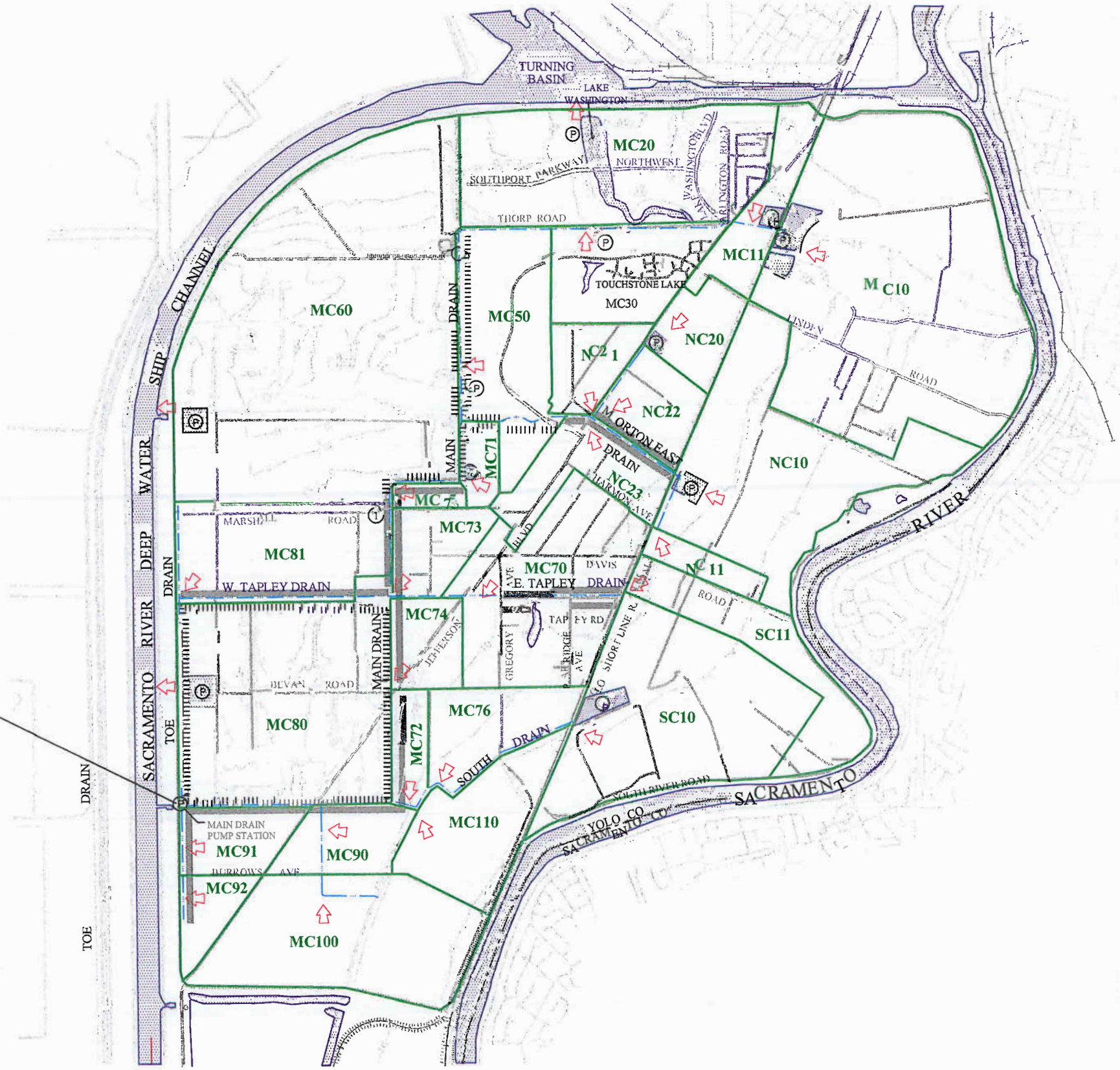
5/11/01

FIGURE 12



LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- EXISTING LEVEE/BERM
- WATER
- LOCATIONS WHERE 100-YEAR WATER SURFACE ELEVATION EXCEEDS GROUND ELEVATION AT RURAL AREAS
- PROPOSED LEVEE AT EXISTING URBAN DEVELOPMENT
- PROPOSED LEVEE AT NEW URBAN DEVELOPMENT
- MC10 — SUBBASIN NAME
- SUBBASIN OUTFALL
- (P) — PUMP STATION
- (1) — 1-6x8 BOX CULVERT

NOTE:

Mitigation measures for the 2000 Condition, that are not funded by drainage fees, are assumed to be in place and are not shown as proposed facilities on this plan.

N

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SCALE IN FEET

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FACILITIES AND SUBBASINS ULTIMATE - ALTERNATIVE A

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SACRAMENTO, CALIFORNIA

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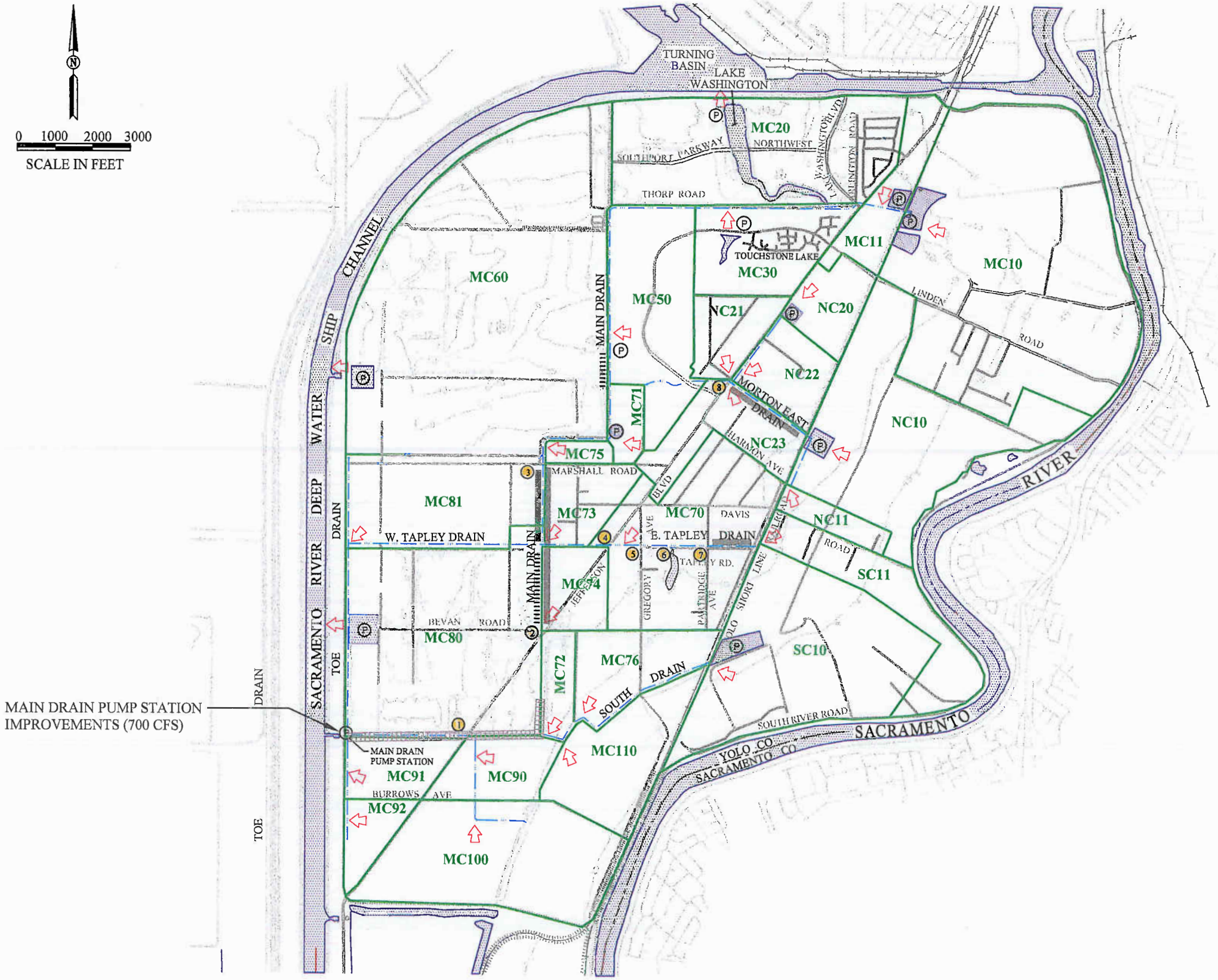
FIGURE 13



LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- EXISTING LEVEE/BERM
- WATER
- LOCATIONS WHERE 100-YEAR WATER SURFACE ELEVATION EXCEEDS GROUND ELEVATION AT RURAL AREAS
- PROPOSED LEVEE AT NEW URBAN DEVELOPMENT
- 60-FOOT BOTTOM WIDTH OF IMPROVED CHANNEL
- MC10 SUBBASIN NAME
- SUBBASIN OUTFALL
- (5) DRAIN CROSSING IMPROVEMENT (SEE BELOW)
- (P) PUMP STATION

DRAIN CROSSING IMPROVEMENTS

MAIN DRAIN	
(1) JEFFERSON-1	(4-6x10 BOX CULVERTS)
(2) JEFFERSON & BEVAN	(3-6x10 BOX CULVERTS)
(3) MARSHALL	(4-6x8 BOX CULVERTS)
E. TAPLEY DRAIN	
(4) JEFFERSON-3	(1-4x6 BOX CULVERT)
(5) GREGORY	(1-4x6 BOX CULVERT)
(6) PRIVATE ROAD A	(1-4x6 BOX CULVERT)
(7) PARTRIDGE	(1-4x6 BOX CULVERT)
MORTON EAST DRAIN	
(8) JEFFERSON-4	(3-6x10 BOX CULVERTS)

NOTE:

Mitigation measures for the 2000 Condition, that are not funded by drainage fees, are assumed to be in place and are not shown as proposed facilities on this plan.

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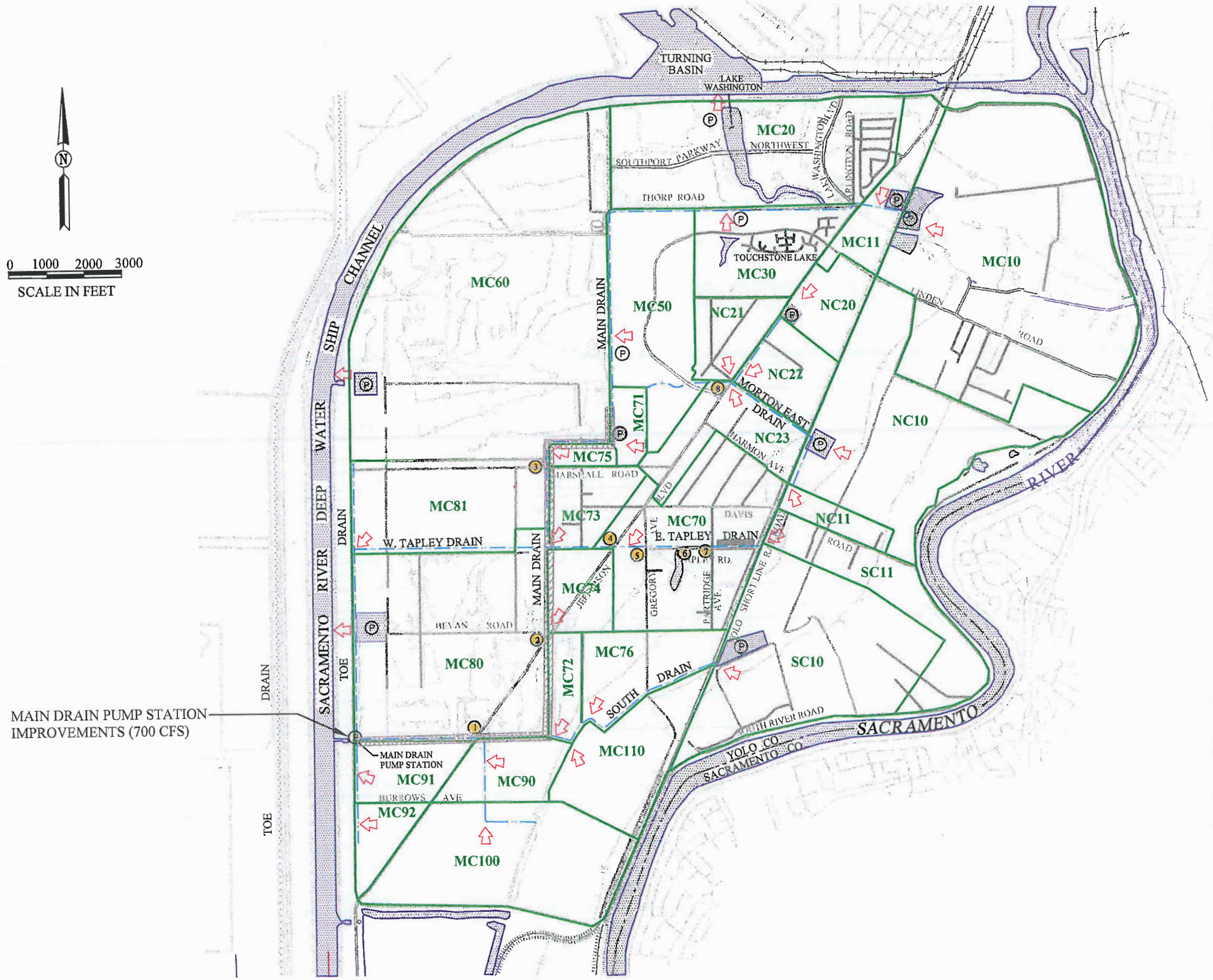
CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FACILITIES AND SUBBASINS ULTIMATE - ALTERNATIVE B

BORCALLI & ASSOCIATES, INC.
SACRAMENTO, CALIFORNIA

FIGURE 14



LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- EXISTING LEVEE/BERM
- WATER
- LOCATIONS WHERE 100-YEAR WATER SURFACE ELEVATION EXCEEDS GROUND ELEVATION AT RURAL AREAS
- 60-FOOT BOTTOM WIDTH OF IMPROVED CHANNEL
- 40-FOOT BOTTOM WIDTH OF IMPROVED CHANNEL
- 30-FOOT BOTTOM WIDTH OF IMPROVED CHANNEL
- MC10 SUBBASIN NAME
- SUBBASIN OUTFALL
- (5) DRAIN CROSSING IMPROVEMENT (SEE BELOW)
- (P) PUMP STATION

DRAIN CROSSING IMPROVEMENTS

MAIN DRAIN

(1) JEFFERSON-1	(4-6x10 BOX CULVERTS)
(2) JEFFERSON & BEVAN	(3-6x10 BOX CULVERTS)
(3) MARSHALL	(4-6x8 BOX CULVERTS)

E. TAPLEY DRAIN

(4) JEFFERSON-3	(1-4x6 BOX CULVERT)
(5) GREGORY	(1-4x6 BOX CULVERT)
(6) PRIVATE ROAD A	(1-4x6 BOX CULVERT)
(7) PARTRIDGE	(1-4x6 BOX CULVERT)

MORTON EAST DRAIN

(8) JEFFERSON-4	(3-6x10 BOX CULVERTS)

NOTE:

Mitigation measures for the 2000 Condition, that are not funded by drainage fees, are assumed to be in place and are not shown as proposed facilities on this plan.

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FACILITIES AND SUBBASINS ULTIMATE - ALTERNATIVE C

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SACRAMENTO, CALIFORNIA

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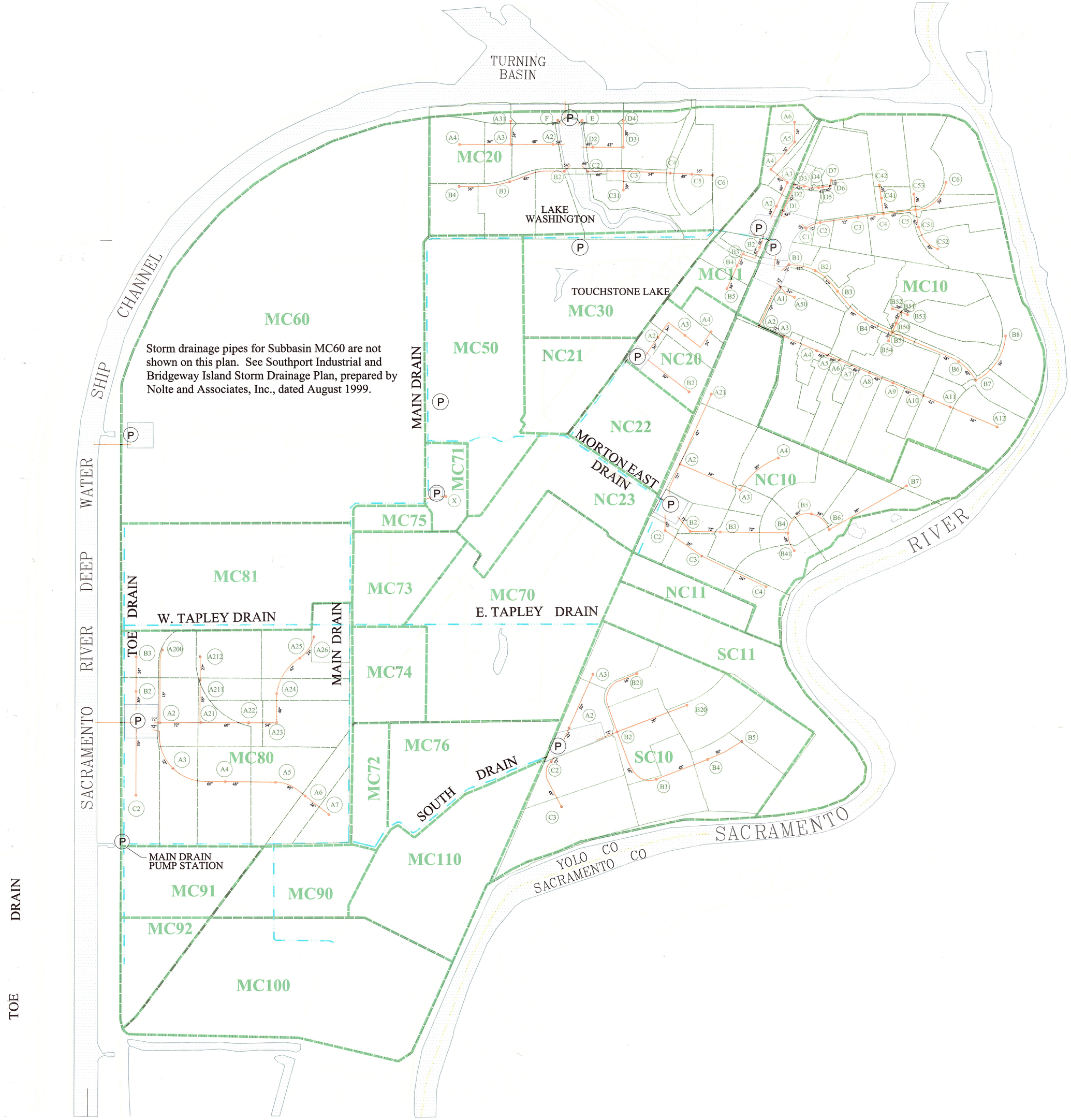
FIGURE 15

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

STORM DRAINAGE PIPE PLAN
ULTIMATE

FIGURE 16



Storm drainage pipes for Subbasin MC60 are not shown on this plan. See Southport Industrial and Bridgeway Island Storm Drainage Plan, prepared by Nolte and Associates, Inc., dated August 1999.

LEGEND

- EXISTING DRAIN
- ROADWAY
- STATE ROUTE
- RAILROAD
- SUBBASIN BOUNDARY
- MC11 — SUBBASIN NAME
- (P) — PUMP STATION
- PIPE SHED BOUNDARY
- STORM DRAINAGE P IPE
- PIPE NODE
- A21 — PIPE NODE NAME
- 48" — PIPE DIAMETER, INCHES
- WATER

NOTES:

1. Topographic mapping is from USGS Quad Map (NGVD29).
2. Trunk storm drainage pipes are defined as pipes with diameters equal to or greater than thirty-three inches.

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Scale in Feet

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

STORM DRAINAGE PIPE PLAN ULTIMATE

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SACRAMENTO, CALIFORNIA

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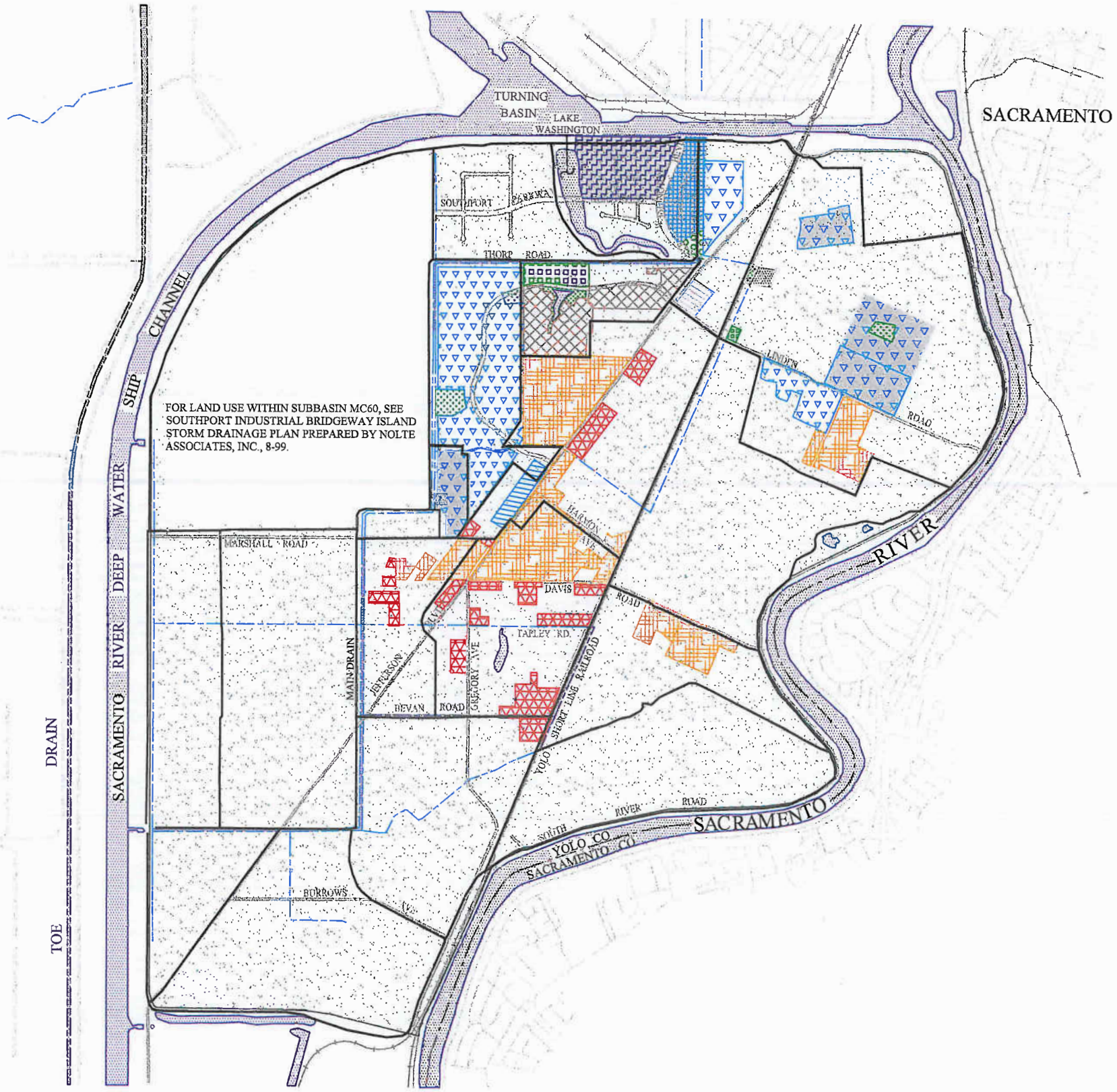
FIGURE 16



LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- AGRICULTURE
- RURAL ESTATES
- RURAL RESIDENTIAL
- LOW-DENSITY RESIDENTIAL
- MEDIUM-DENSITY RESIDENTIAL
- RECREATION AND PARKS
- NEIGHBORHOOD COMMERCIAL
- COMMUNITY COMMERCIAL
- GENERAL COMMERCIAL
- PUBLIC/QUASI-PUBLIC
- WATER
- WATER-RELATED INDUSTRIAL
- OPEN SPACE
- BUSINESS PARK
- PHASE 1 DEVELOPMENT

SOURCES

1. City of West Sacramento, "General Plan Land Use Diagram," revised 2000.
2. City of West Sacramento, Aerial Photograph, July 23, 1993.
3. City of West Sacramento, Aerial Photograph, July 17, 1999.

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SCALE IN FEET

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

LAND USE
PHASE I

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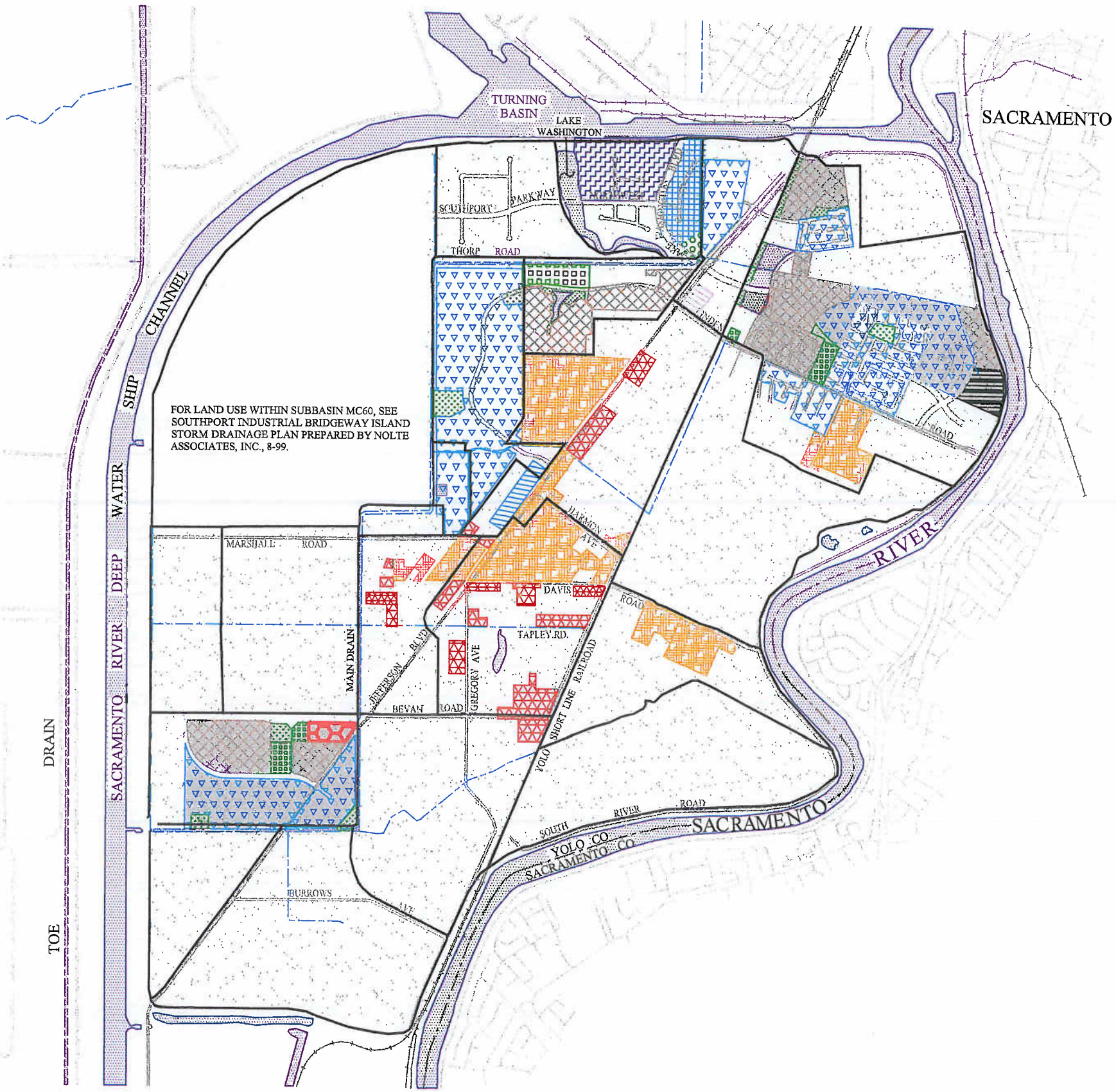
SACRAMENTO, CALIFORNIA

5/11/01

FIGURE 17



LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- AGRICULTURE
- RURAL ESTATES
- RURAL RESIDENTIAL
- LOW-DENSITY RESIDENTIAL
- MEDIUM-DENSITY RESIDENTIAL
- HIGH-DENSITY RESIDENTIAL
- RECREATION AND PARKS
- NEIGHBORHOOD COMMERCIAL
- COMMUNITY COMMERCIAL
- GENERAL COMMERCIAL
- PUBLIC/QUASI-PUBLIC
- MIXED USE
- WATER-RELATED INDUSTRIAL
- BUSINESS PARK
- WATER
- PHASE 2 DEVELOPMENT

SOURCES

1. City of West Sacramento, "General Plan Land Use Diagram," revised 2000.
2. City of West Sacramento, Aerial Photograph, July 23, 1993.
3. City of West Sacramento, Aerial Photograph, July 17, 1999.

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0 1000 2000 3000

SCALE IN FEET

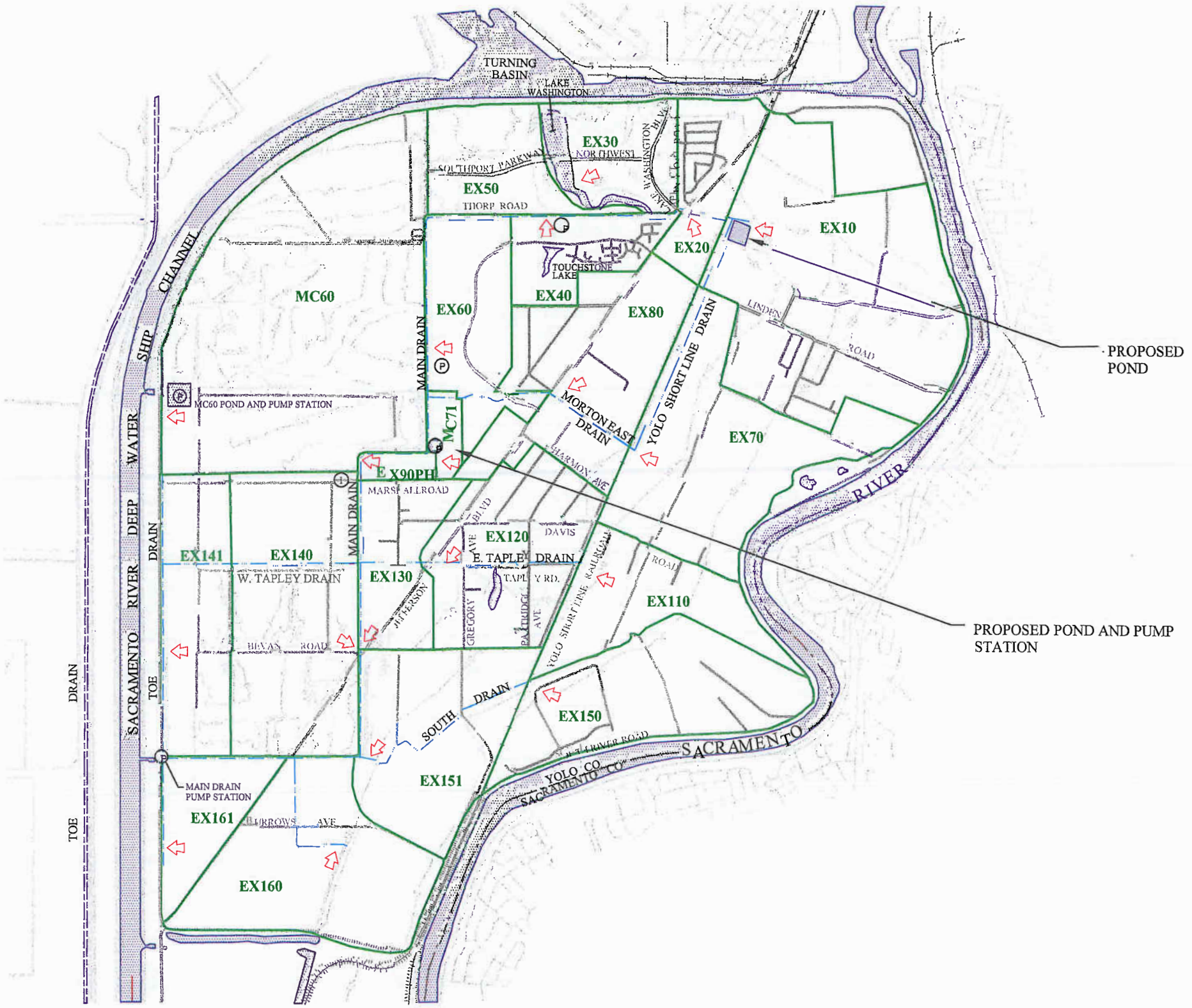
CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

LAND USE
PHASE 2

BORCALLI & ASSOCIATES, INC.
SACRAMENTO, CALIFORNIA

5/11/01

FIGURE 18



LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- EXISTING LEVEE/BERM
- WATER
- EX10 SUBBASIN NAME
- SUBBASIN OUTFALL
- (P) PUMP STATION
- (1) 1-6x8 BOX CULVERT

NOTE:

Mitigation measures for the 2000 condition, that are not funded by drainage fees, are assumed to be in place and and are not shown as proposed facilities on this plan.

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0 1000 2000 4000

SCALE IN FEET

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FACILITIES AND SUBBASINS PHASE I

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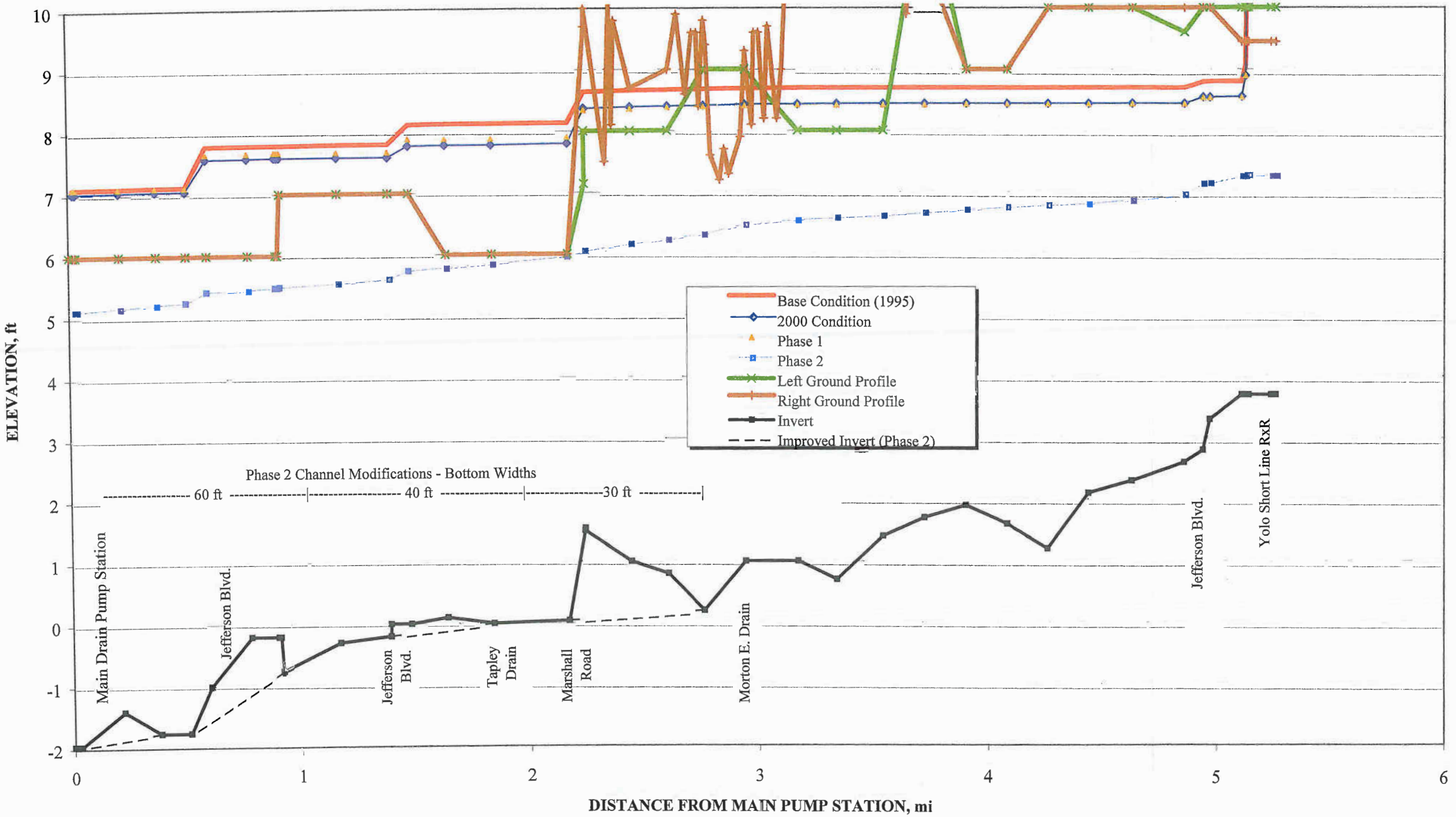
SACRAMENTO, CALIFORNIA

5/11/01

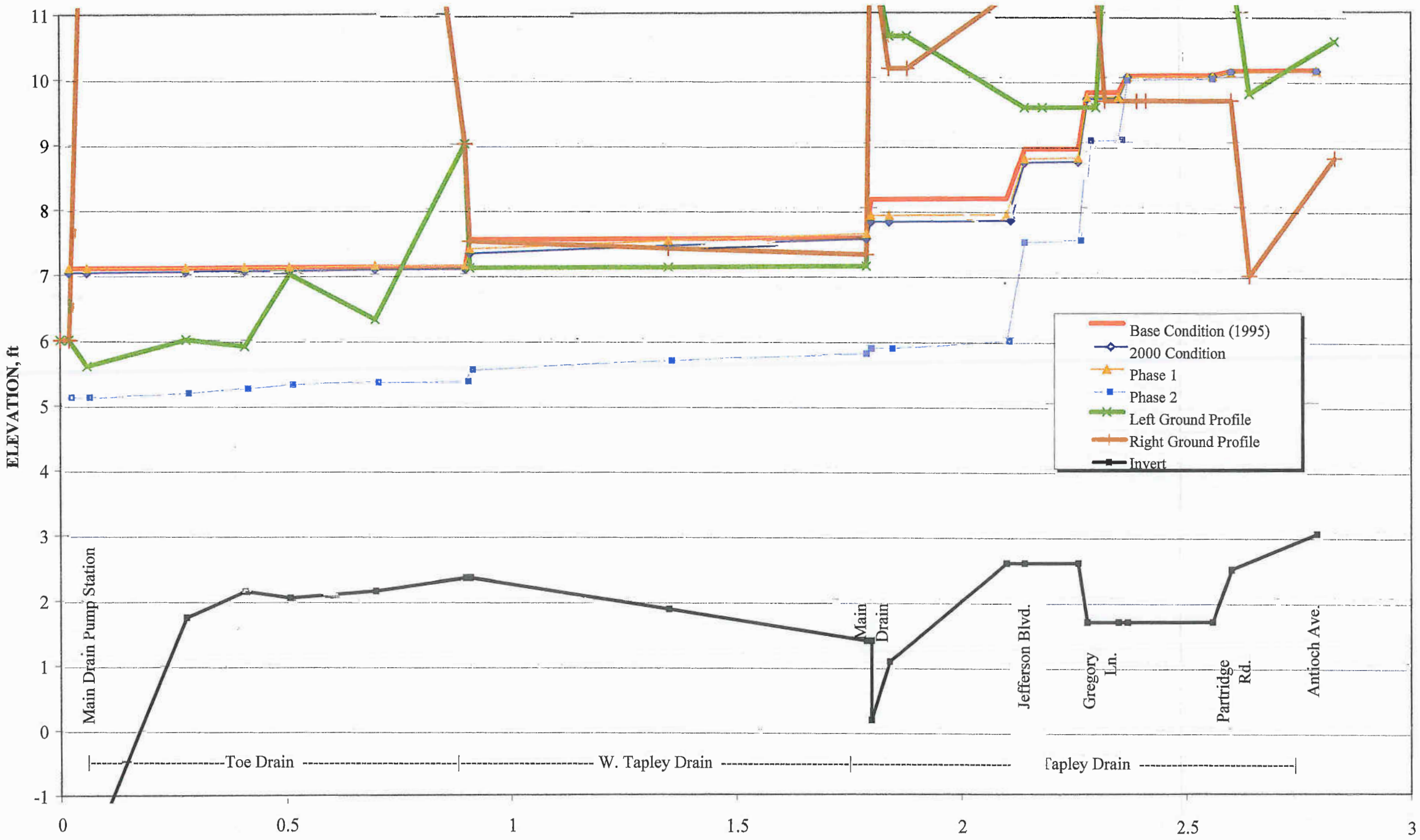
FIGURE 19

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE
DRAIN PROFILES
BASE, 2000, PHASE 1 AND PHASE 2 CONDITIONS
MAIN DRAIN MAXIMUM 100-YEAR WATER SURFACE ELEVATIONS



Note
Based upon UNET model of 100-Year, 24-Hour storm event.

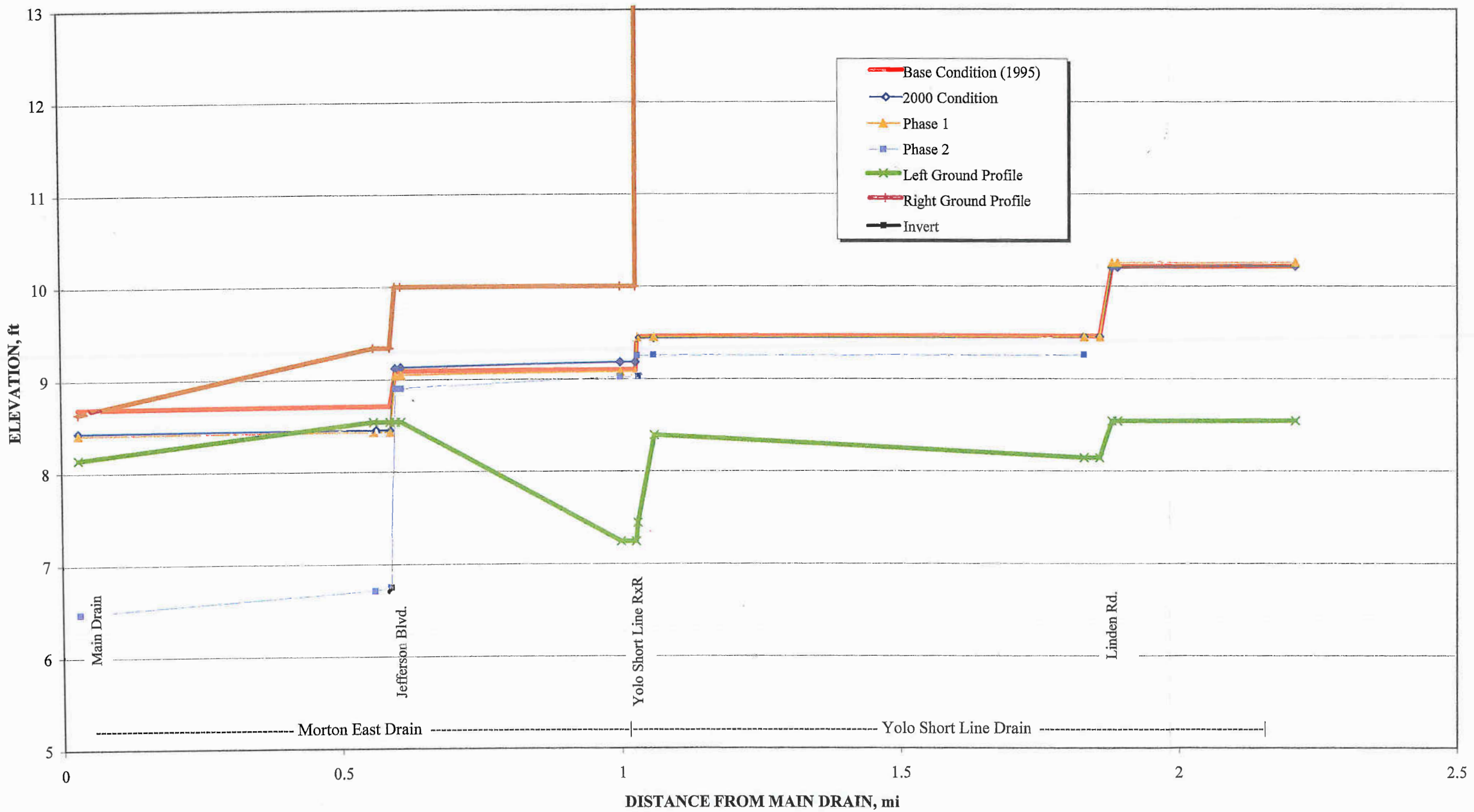
CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE
DRAIN PROFILES
BASE, 2000, PHASE 1 AND PHASE 2 CONDITIONS
TAPLEY DRAIN MAXIMUM 100-YEAR WATER SURFACE ELEVATIONS



Note
Based upon UNET model of 100-Year, 24-Hour storm event.

Profiles.xls Figure 20-2 Tapley
Borcalli & Associates, Inc.
Southport Drainage Master Plan Update
May 4, 2001

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE
DRAIN PROFILES
BASE, 2000, PHASE 1 AND PHASE 2 CONDITIONS
MORTON E. DRAIN MAXIMUM 100-YEAR WATER SURFACE ELEVATIONS

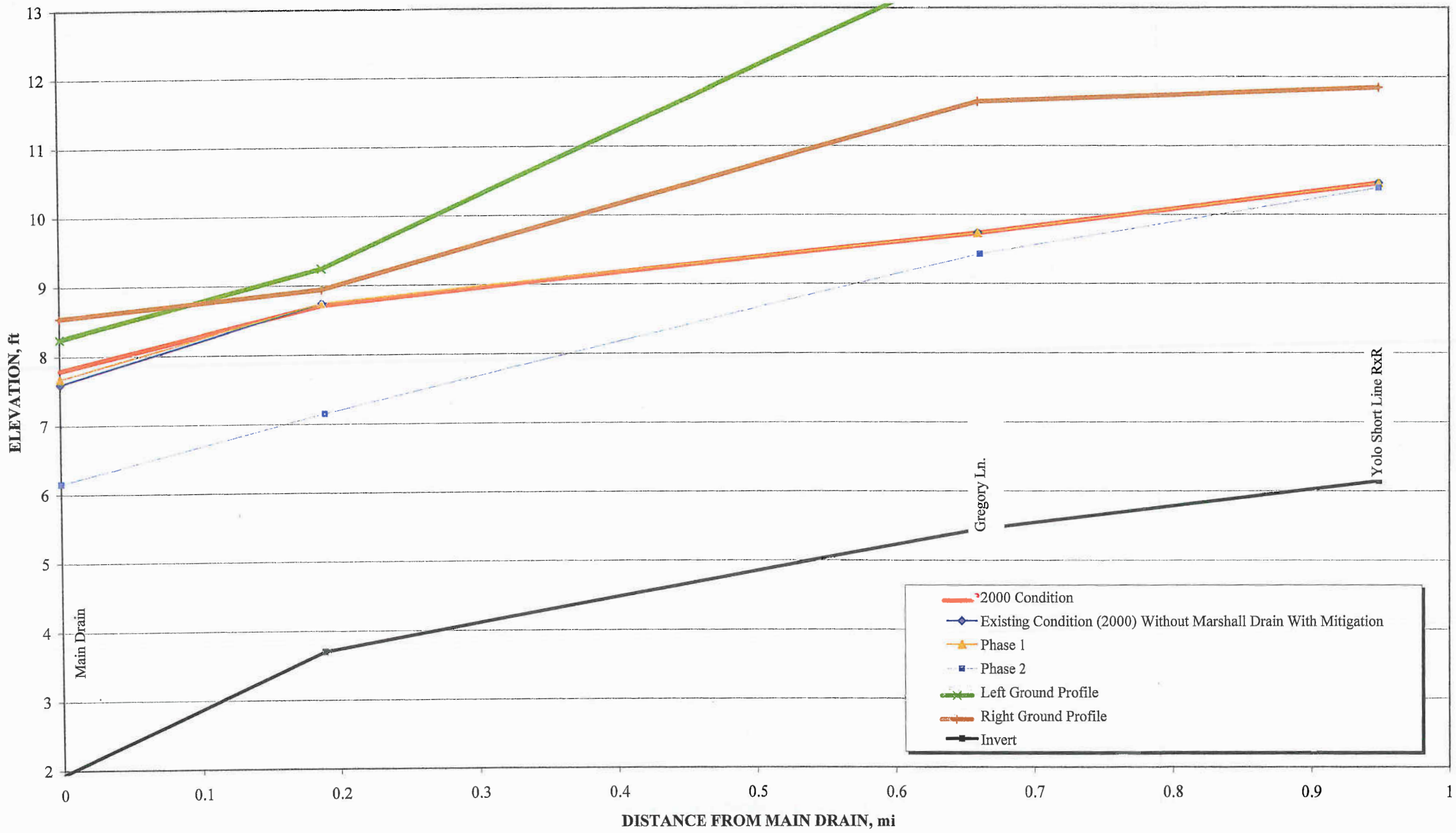


Note
Based upon UNET model of 100-Year, 24-Hour storm event.

Profiles.xls Figure 20-3 Morton
Borcalli & Associates, Inc.
Southport Drainage Master Plan Update
May 4, 2001

FIGURE 20
SHEET 3 OF 4

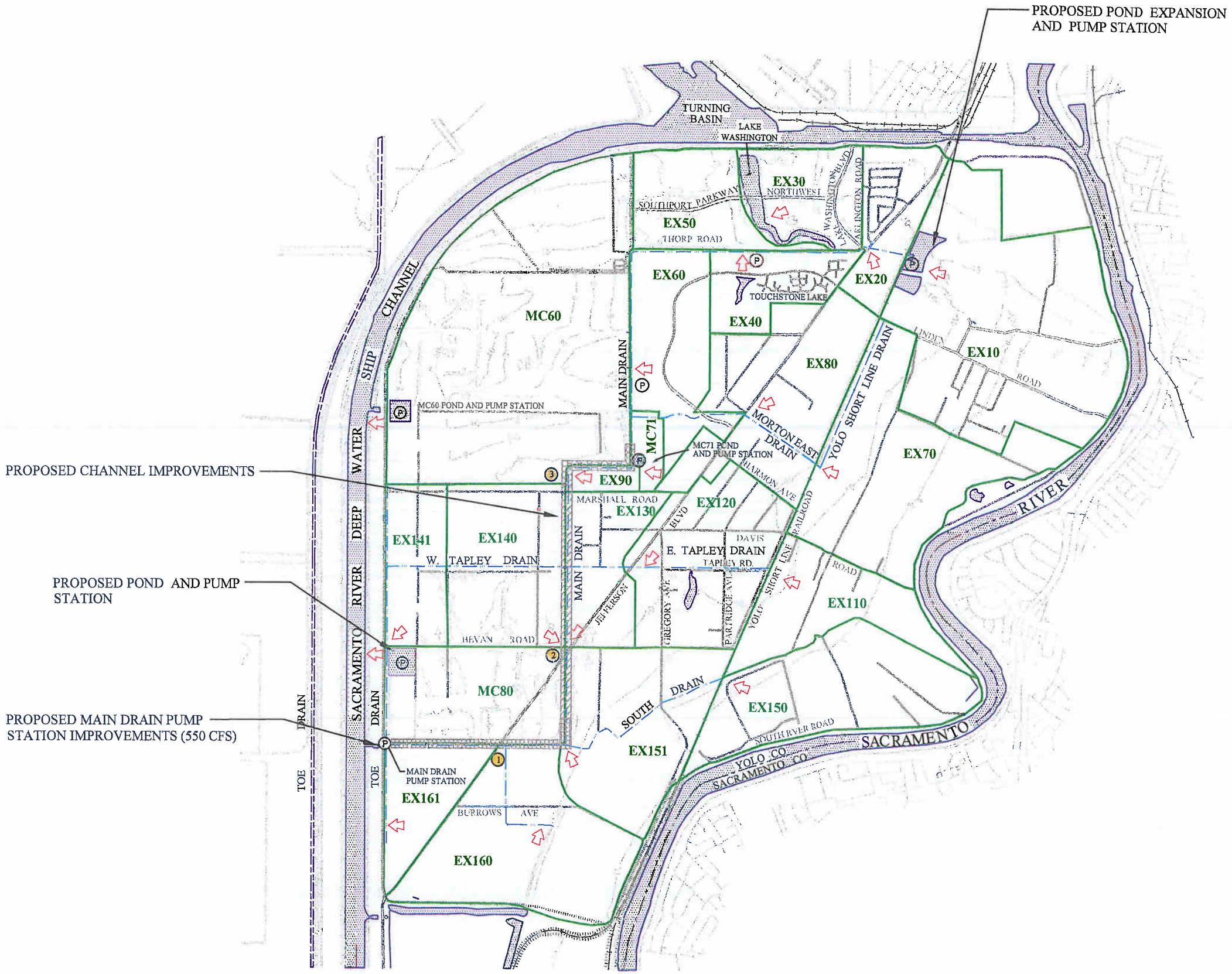
CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE
DRAIN PROFILES
BASE, 2000, PHASE 1 AND PHASE 2 CONDITIONS
SOUTH DRAIN MAXIMUM 100-YEAR WATER SURFACE ELEVATIONS



Note
Based upon UNET model of 100-Year, 24-Hour storm event.

Profiles.xls Figure 20-4 South
Borcalli & Associates, Inc.
Southport Drainage Master Plan Update
May 4, 2001

FIGURE 20
SHEET 4 OF 4



LEGEND

- EXISTING DRAIN
- SUBBASIN BOUNDARY
- ROADWAY
- STATE ROUTE
- RAILROAD
- EXISTING LEVEE/BERM
- WATER
- 60-FOOT BOTTOM WIDTH OF IMPROVED CHANNEL
- 40-FOOT BOTTOM WIDTH OF IMPROVED CHANNEL
- 30-FOOT BOTTOM WIDTH OF IMPROVED CHANNEL
- EX10 — SUBBASIN NAME
- SUBBASIN OUTFALL
- (1) DRAIN CROSSING IMPROVEMENTS (SEE BELOW)
- (P) PUMP STATION

DRAIN CROSSING IMPROVEMENTS

MAIN DRAIN

(1) JEFFERSON-1	(4-6x10 BOX)
(2) JEFFERSON & BEVAN	(3-6x10 BOX)
(3) MARSHALL	(4-6x8 BOX)

NOTE:

Mitigation measures for the 2000 condition, that are not funded by drainage fees, are assumed to be in place and are not shown as proposed facilities on this plan.

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SCALE IN FEET

5/11/01

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FACILITIES AND SUBBASINS PHASE 2

BORCALLI & ASSOCIATES, INC.
SACRAMENTO, CALIFORNIA

FIGURE 21

Appendix A

DRAINAGE PRINCIPLES FROM THE 1995 SOUTHPORT DMP

APPENDIX A

SOUTHPORT DRAINAGE MASTER PLAN (DMP)
DRAINAGE PRINCIPLES

Issue	Principle
B. Formulate an Environmentally Acceptable DMP that has been Coordinated with Other Responsible Agencies Within Southport	1. Develop the DMP to be compatible with the Southport Habitat Mitigation Plan under development by the City. 2. Develop channel section geometry, operation, and maintenance criteria which will permit channels to provide habitat credits by governing agencies. 3. Incorporate urban storm water best management practices into the DMP to claim channels as providing habitat credits. 4. Where feasible and compatible with drainage requirements, the DMP shall encourage multipurpose uses such as open spaces, wildlife habitat, wetlands, bike and pedestrian trails, and recreation. Funding for these features will be determined based upon beneficial uses and ultimate purpose of the feature. 5. Storm water detention facilities may be located within, but may not occupy, more than 50 percent of a neighborhood park. The side slopes must be 4:1 or flatter.
C. Formulate a DMP with Clear Definition for Responsibility and Ownership, and Operations and Maintenance	1. The ownership and responsibility for design, construction, operations and maintenance of the DMP will be clearly defined in agreements between the responsible agencies. 2. Funding for the design, construction, operation, and maintenance of the DMP will be proportioned among those users that benefit by the facilities.
D. Providing a Phasing Plan that Assures that the DMP is Implemented in Increments that Provide the Level of Protection to the Incrementally Developed Area in Accordance with City Standards	1. Develop a Phasing Plan which provides adequate incremental drainage, and which ultimately results in the completion of the master drainage system. 2. Coordinate development of the phasing plan with the development of the financing plan to provide compatibility between the two plans. 3. Construct adequate drainage facilities before each new increment of development is approved for construction.

APPENDIX A

SOUTHPORT DRAINAGE MASTER PLAN (DMP)
DRAINAGE PRINCIPLES

Issue	Principle
B. Formulate an Environmentally Acceptable DMP that has been Coordinated with Other Responsible Agencies Within Southport	1. Develop the DMP to be compatible with the Southport Habitat Mitigation Plan under development by the City. 2. Develop channel section geometry, operation, and maintenance criteria which will permit channels to provide habitat credits by governing agencies. 3. Incorporate urban storm water best management practices into the DMP to claim channels as providing habitat credits. 4. Where feasible and compatible with drainage requirements, the DMP shall encourage multipurpose uses such as open spaces, wildlife habitat, wetlands, bike and pedestrian trails, and recreation. Funding for these features will be determined based upon beneficial uses and ultimate purpose of the feature. 5. Storm water detention facilities may be located within, but may not occupy, more than 50 percent of a neighborhood park. The side slopes must be 4:1 or flatter.
C. Formulate a DMP with Clear Definition for Responsibility and Ownership, and Operations and Maintenance	1. The ownership and responsibility for design, construction, operations and maintenance of the DMP will be clearly defined in agreements between the responsible agencies. 2. Funding for the design, construction, operation, and maintenance of the DMP will be proportioned among those users that benefit by the facilities.
D. Providing a Phasing Plan that Assures that the DMP is Implemented in Increments that Provide the Level of Protection to the Incrementally Developed Area in Accordance with City Standards	1. Develop a Phasing Plan which provides adequate incremental drainage, and which ultimately results in the completion of the master drainage system. 2. Coordinate development of the phasing plan with the development of the financing plan to provide compatibility between the two plans. 3. Construct adequate drainage facilities before each new increment of development is approved for construction.

Appendix B

OPINIONS OF PROBABLE COST

TABLE B-1

CITY OF WEST SACRAMENTO
SOUTHPORT DMP UPDATE

OPINION OF PROBABLE COST
FOR 2000 CONDITION MITIGATION MEASURES

Description	Quantity	Unit	Unit Cost, $	Cost, $ [1]
Nonreimbursable/Noncreditable DMP Facilities				
1. Clearing, Grubbing, & Mobilization	1	ea	3,000.00	3,000
2. Removal and Disposal of Existing Culverts	2	ea	1,500.00	3,000
3. 5'x8' Box Culvert at Main Drain and West Tapley Drain	35	lf	920.00	32,200
4. 5'x8' Box Culvert at Toe Drain and West Tapley Drain	35	lf	920.00	32,200
Subtotal Nonreimbursable/Noncreditable DMP Facilities Construction Cost				70,400
Contingencies @ 25%				17,600
Subtotal				88,000
Engineering @ 20%				17,600
Subtotal Nonreimbursable/Noncreditable DMP Facilities				105,600
Reimbursable/Creditable Facilities				
1. Clearing, Grubbing, & Mobilization	1	ea	1,500.00	1,500
2. Removal and Disposal of Existing Culverts	1	ea	1,500.00	1,500
3. 6'x8' Box Culvert at Main Drain and Marshall Road	110	lf	920.00	101,200
Subtotal Reimbursable/Creditable Facilities Construction Cost				104,200
Contingencies @ 25%				26,050
Subtotal				130,250
Engineering @ 20%				26,050
Subtotal Reimbursable/Creditable Facilities				156,300
TOTAL MITIGATION MEASURES				262,000

[1]Costs are based upon 2000 price levels.

TABLE B-2

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUMMARY OF OPINIONS OF PROBABLE COST
COMMON DRAINAGE FACILITIES
ALTERNATIVE B

Description	Total Cost, $[1]
Common Drainage Facilities Construction Cost	
1. Main Drain Pump Station Improvements	9,282,500
2. Main Drain Channel Improvements	360,200
3. Main Drain Levee Improvements	33,400
4. Road Crossing Improvements	1,718,300
5. Maintenance Road Improvements	1,050,000
Subtotal Construction Cost	12,444,400
Construction Contingencies (25%)	3,111,100
Engineering (20%)	2,488,880
Subtotal	18,044,380
Common Drainage Facilities Land Acquisition Cost	
1. Main Drain Pump Station	7,200
Subtotal Land Acquisition Cost [2]	7,200
Land Contingencies (35%)	2,520
Acquisition Allowance (25%)	1,800
Contingency on Acquisition Allowance (25%)	450
Subtotal	11,970
Southport Drainage Master Plan Update Study	80,000
TOTAL	18,136,000

[1]Costs are based upon 2000 price levels.

[2]Land acquisition cost does not include drainage corridor acquisition for Main Drain channel improvements. It is assumed either existing rights-of-way or easements are in place or that lands will be dedicated.

TABLE B-3

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
COMMON DRAINAGE FACILITIES
ALTERNATIVE B

Description	Quantity	Unit	Unit Cost, $	Total Cost, $[1]
Common Drainage Facilities Construction Cost				
1. Main Drain Pump Station Improvements				
a. Demolition of Existing Pump Station	1	ls	125,000.00	125,000
b. Pump Station[2]	555	cfs	16,500.00	9,157,500
Subtotal Main Drain Pump Station Improvements				9,282,500
2. Main Drain Channel Improvements				
a. 6,000 lf with 60 ft Bottom Width				
(1) Cut in Dry Sections				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	49,000	cy	3.40	166,600
· Haul and Dump for Drying	49,000	cy	1.25	61,300
· Spread, Compact, and Shape Excess Material	49,000	cy	2.70	132,300
b. 5,000 lf with 40 ft Bottom Width				
(1) Cut in Dry Sections				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	0	cy	3.40	0
· Haul and Dump for Drying	0	cy	1.25	0
· Spread, Compact, and Shape Excess Material	0	cy	2.70	0
c. 4,000 lf with 30 ft Bottom Width				
(1) Cut in Dry Sections				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	0	cy	3.40	0
· Haul and Dump for Drying	0	cy	1.25	0
· Spread, Compact, and Shape Excess Material	0	cy	2.70	0
Subtotal Main Drain Channel Improvements				360,200

TABLE B-3

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
COMMON DRAINAGE FACILITIES
ALTERNATIVE B

	Quantity	Unit	Unit Cost, $	Total Cost, $[1]
3. Main Drain Levee Improvements				
a. Levee Improvements				
(1) Clear and Grub for Base				
· Stripping and Vegetation (6")	3,050	cy	0.80	2,400
· Subexcavation and Recompaction (12")	6,100	cy	2.70	16,500
(2) Fill for New Embankment				
· Haul and Dump On-site Dry Material	5,800	cy	1.10	6,400
· Compact and Shape On-site Fill Material	5,800	cy	1.40	8,100
Subtotal Main Drain Levee Improvements				33,400
4. Road Crossing Improvements				
a. Main Drain Road Crossings				
(1) Jefferson-1 (4-6x10 Box Culverts)				
· Materials	320	lf	350.00	112,000
· Installation	320	lf	300.00	96,000
· Wing Walls	1	ls	80,000.00	80,000
· Traffic Control	1	ls	30,000.00	30,000
· Pavement Replacement	1,000	sy	40.00	40,000
(2) Jefferson & Bevan (3-6x10 Box Culverts)				
· Materials	360	lf	350.00	126,000
· Installation	360	lf	300.00	108,000
· Wing Walls	1	ls	70,000.00	70,000
· Traffic Control	1	ls	30,000.00	30,000
· Pavement Replacement	1,300	sy	40.00	52,000
(3) Marshall (4-6x8 Box Culverts)				
· Materials	200	lf	325.00	65,000
· Installation	200	lf	275.00	55,000
· Wing Walls	1	ls	80,000.00	80,000
· Traffic Control	1	ls	30,000.00	30,000
· Pavement Replacement	570	sy	40.00	22,800
b. East Tapley Drain Road Crossings				
(1) Jefferson-3 (1-4x6 Box Culvert)				
· Materials	90	lf	200.00	18,000
· Installation	90	lf	160.00	14,400
· Wing Walls	1	ls	40,000.00	40,000
· Traffic Control	1	ls	30,000.00	30,000
· Pavement Replacement	700	sy	40.00	28,000

TABLE B-3

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
COMMON DRAINAGE FACILITIES
ALTERNATIVE B

Description	Quantity	Unit	Unit Cost, $	Total Cost, $[1]
(2) Gregory (1-4x6 Box Culvert)				
· Materials	55	lf	200.00	11,000
· Installation	55	lf	160.00	8,800
· Wing Walls	1	ls	40,000.00	40,000
· Traffic Control	1	ls	20,000.00	20,000
· Pavement Replacement	430	sy	27.00	11,600
(3) Private Road A (1-4x6 Box Culvert)				
· Materials	55	lf	200.00	11,000
· Installation	55	lf	160.00	8,800
· Wing Walls	1	ls	40,000.00	40,000
· Traffic Control	1	ls	20,000.00	20,000
· Pavement Replacement	430	sy	27.00	11,600
(4) Partridge (1-4x6 Box Culvert)				
· Materials	40	lf	200.00	8,000
· Installation	40	lf	160.00	6,400
· Wing Walls	1	ls	40,000.00	40,000
· Traffic Control	1	ls	20,000.00	20,000
· Pavement Replacement	310	sy	27.00	8,400
c. Morton East Drain Crossing Improvements				
(1) Jefferson-4 (3-6x10 Box Culverts)				
· Materials	270	lf	350.00	94,500
· Installation	270	lf	300.00	81,000
· Wing Walls	1	ls	80,000.00	80,000
· Traffic Control	1	ls	30,000.00	30,000
· Pavement Replacement	1,000	sy	40.00	40,000
Subtotal Road Crossing Improvements				1,718,300
5. Maintenance Road Improvements	75,000	lf	14.00	1,050,000
Subtotal Maintenance Road Improvements				1,050,000
Subtotal Common Drainage Facilities Construction Cost				12,444,400
Common Drainage Facilities Land Acquisition Cost[3]				
1. Main Drain Pump Station	0.18	ac	40,000.00	7,200
TOTAL COMMON DRAINAGE FACILITIES LAND ACQUISITION	0.18	ac	40,000.00	7,200

[1]Unit costs are based upon 2000 price levels.

[2]Total proposed Main Pump Station capacity is 700 cfs. Existing three pumps (145 cfs) that were installed in approximately 1979 will remain.

[3]Land acquisition cost does not include drainage corridor acquisition for Main Drain channel improvements. It is assumed either existing rights-of-way or easements are in place or that lands will be dedicated.

TABLE B-4

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUMMARY OF OPINIONS OF PROBABLE COST
COMMON DRAINAGE FACILITIES
ALTERNATIVE C (PREFERRED DRAINAGE PLAN)

Description	Total Cost, $[1]
Common Drainage Facilities Construction Cost	
1. Main Drain Pump Station Improvements	9,282,500
2. Main Drain Channel Improvements	683,700
3. Main Drain Levee Improvements	0
4. Road Crossing Improvements	1,718,300
5. Maintenance Road Improvements	1,050,000
Subtotal Construction Cost	12,734,500
Construction Contingencies (25%)	3,183,625
Engineering (20%)	2,546,900
Subtotal	18,465,025
Common Drainage Facilities Land Acquisition Cost	
1. Main Drain Pump Station	7,200
Subtotal Land Acquisition Cost [2]	7,200
Land Contingencies (35%)	2,520
Acquisition Allowance (25%)	1,800
Contingency on Acquisition Allowance (25%)	450
Subtotal	11,970
Southport Drainage Master Plan Update Study	80,000
TOTAL	18,557,000

[1]Costs are based upon 2000 price levels.

[2]Land acquisition cost does not include drainage corridor acquisition for Main Drain channel improvements. It is assumed either existing rights-of-way or easements are in place or that lands will be dedicated.

TABLE B-5

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COSTS
COMMON DRAINAGE FACILITIES
ALTERNATIVE C (PREFERRED DRAINAGE PLAN)

Description	Quantity	Unit	Unit Cost, $	Total Cost, $[1]
Common Drainage Facilities Construction Cost				
1. Main Drain Pump Station Improvements				
a. Demolition of Existing Pump Station	1	ls	125,000.00	125,000
b. Pump Station[2]	555	cfs	16,500.00	9,157,500
Subtotal Main Drain Pump Station Improvements				9,282,500
2. Main Drain Channel Improvements				
a. 6,000 lf with 60 ft Bottom Width				
(1) Cut in Dry Sections				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	49,000	cy	3.40	166,600
· Haul and Dump for Drying	49,000	cy	1.25	61,300
· Spread, Compact, and Shape Excess Material	49,000	cy	2.70	132,300
b. 5,000 lf with 40 ft Bottom Width				
(1) Cut in Dry Sections				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	19,000	cy	3.40	64,600
· Haul and Dump for Drying	19,000	cy	1.25	23,800
· Spread, Compact, and Shape Excess Material	19,000	cy	2.70	51,300
c. 4,000 lf with 30 ft Bottom Width				
(1) Cut in Dry Sections				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	25,000	cy	3.40	85,000
· Haul and Dump for Drying	25,000	cy	1.25	31,300
· Spread, Compact, and Shape Excess Material	25,000	cy	2.70	67,500
Subtotal Main Drain Channel Improvements				683,700

TABLE B-5

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COSTS
COMMON DRAINAGE FACILITIES
ALTERNATIVE C (PREFERRED DRAINAGE PLAN)

	Quantity	Unit	Unit Cost, $	Total Cost, $[1]	
3. Main Drain Levee Improvements					
a. Levee Improvements					
(1) Clear and Grub for Base					
· Stripping and Vegetation (6")	0	cy	0.80	0	
· Subexcavation and Recompaction (12")	0	cy	2.70	0	
(2) Fill for New Embankment					
· Haul and Dump On-site Dry Material	0	cy	1.10	0	
· Compact and Shape On-site Fill Material	0	cy	1.40	0	
Subtotal Main Drain Levee Improvements				0	
4. Road Crossing Improvements					
a. Main Drain Road Crossings					
(1) Jefferson-1 (4-6x10 Box Culverts)					
· Materials	320	lf	350.00	112,000	
· Installation	320	lf	300.00	96,000	
· Wing Walls	1	ls	80,000.00	80,000	
· Traffic Control	1	ls	30,000.00	30,000	
· Pavement Replacement	1,000	sy	40.00	40,000	358,000
(2) Jefferson & Bevan (3-6x10 Box Culverts)					
· Materials	360	lf	350.00	126,000	
· Installation	360	lf	300.00	108,000	
· Wing Walls	1	ls	70,000.00	70,000	
· Traffic Control	1	ls	30,000.00	30,000	
· Pavement Replacement	1,300	sy	40.00	52,000	386,000
(3) Marshall (4-6x8 Box Culverts)					
· Materials	200	lf	325.00	65,000	
· Installation	200	lf	275.00	55,000	
· Wing Walls	1	ls	80,000.00	80,000	
· Traffic Control	1	ls	30,000.00	30,000	
· Pavement Replacement	570	sy	40.00	22,800	252,800
b. East Tapley Drain Road Crossings					
(1) Jefferson-3 (1-4x6 Box Culvert)					
· Materials	90	lf	200.00	18,000	
· Installation	90	lf	160.00	14,400	
· Wing Walls	1	ls	40,000.00	40,000	
· Traffic Control	1	ls	30,000.00	30,000	
· Pavement Replacement	700	sy	40.00	28,000	

TABLE B-5

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COSTS
COMMON DRAINAGE FACILITIES
ALTERNATIVE C (PREFERRED DRAINAGE PLAN)

	Quantity	Unit	Unit Cost, $	Total Cost, $[1]
(2) Gregory (1-4x6 Box Culvert)				
· Materials	55	lf	200.00	11,000
· Installation	55	lf	160.00	8,800
· Wing Walls	1	ls	40,000.00	40,000
· Traffic Control	1	ls	20,000.00	20,000
· Pavement Replacement	430	sy	27.00	11,600
(3) Private Road A (1-4x6 Box Culvert)				
· Materials	55	lf	200.00	11,000
· Installation	55	lf	160.00	8,800
· Wing Walls	1	ls	40,000.00	40,000
· Traffic Control	1	ls	20,000.00	20,000
· Pavement Replacement	430	sy	27.00	11,600
(4) Partridge (1-4x6 Box Culvert)				
· Materials	40	lf	200.00	8,000
· Installation	40	lf	160.00	6,400
· Wing Walls	1	ls	40,000.00	40,000
· Traffic Control	1	ls	20,000.00	20,000
· Pavement Replacement	310	sy	27.00	8,400
c. Morton East Drain Crossing Improvements				
(1) Jefferson-4 (3-6x10 Box Culverts)				
· Materials	270	lf	350.00	94,500
· Installation	270	lf	300.00	81,000
· Wing Walls	1	ls	80,000.00	80,000
· Traffic Control	1	ls	30,000.00	30,000
· Pavement Replacement	1,000	sy	40.00	40,000
Subtotal Road Crossing Improvements				1,718,300
5. Maintenance Road Improvements	75,000	lf	14.00	1,050,000
Subtotal Maintenance Road Improvements				1,050,000
Total Common Drainage Facilities Construction Cost				12,734,500
Common Drainage Facilities Land Acquisition Cost[3]				
1. Main Drain Pump Station	0.18	ac	40,000.00	7,200
TOTAL COMMON DRAINAGE FACILITIES LAND ACQUISITION	0.18	ac	40,000.00	7,200

[1]Unit costs are based upon 2000 price levels.

[2]Total proposed Main Pump Station Capacity is 700 cfs. Existing three pumps (145 cfs) that were installed in approximately 1979 will remain.

[3]Land acquisition cost does not include drainage corridor acquisition for Main Drain channel improvements. It is assumed either existing rights-of-way or easements are in place or that lands will be dedicated.

TABLE B-6

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUMMARY OF OPINIONS OF PROBABLE COST
PREFERRED DRAINAGE PLAN
SUBBASIN SPECIFIC DRAINAGE FACILITIES

Subbasin[1]	Cost, $[2]
MC10	12,246,000
MC11	2,159,000
MC20	6,671,000
MC71	488,000
MC80	7,717,000
NC10	6,102,000
NC20	1,179,000
SC10	5,615,000
TOTAL	**42,177,000**

[1]This report does not include subbasin specific drainage facilities for Subbasin MC30 and MC60.

[2]Costs are based upon 2000 price levels.

TABLE B-7

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC10

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	62,000	cy	1.70	105,400
· Haul and Dump Excess Material	62,000	cy	1.10	68,200
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	218,000	cy	3.40	741,200
· Haul and Dump Excess Material	218,000	cy	1.25	272,500
· Spread, Compact, and Shape Excess Material	0	cy	2.70	0
b. 48" Connector Pipe under Lake Washington Bld.	300	lf	172.00	51,600
c. Inlet/Outlet Structures at Connector Pipe	2	ea	5,000.00	10,000
d. Dewatering	1	ls	300,000.00	300,000
e. Access Road	5,600	lf	12.00	67,200
f. Hydroseed Pond Slopes	73,000	sf	0.04	2,900
g. Irrigation and Planting	60,000	sf	1.00	60,000
h. Land Acquisition	17.0	ac	40,000.00	680,000
Subtotal - Detention Pond				2,359,000
2. Pump Station				
a. Pump Station	130	cfs	16,500.00	2,145,000
b. Discharge Pipe, Bore & Jack under RxR	200	lf	545.00	109,000
c. Gated Outlet Structure at discharge at Main Drain	1	ea	5,000.00	5,000
Subtotal - Pump Station				2,259,000
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	3,390	lf	116.00	393,200
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	3,320	lf	143.00	474,800
e. 48" Diameter R.C.P.	3,260	lf	172.00	560,700
f. 54" Diameter R.C.P.	0	lf	204.00	0
g. 60" Diameter R.C.P.	1,400	lf	238.00	333,200
h. 66" Diameter R.C.P.	3,420	lf	275.00	940,500
i. 72" Diameter R.C.P.	4,490	lf	315.00	1,414,400
j. 60" Diameter Manhole	18	ea	2,790.00	50,200
k. 72" Diameter Manhole	7	ea	3,580.00	25,100
l. Saddle Manhole	32	ea	5,590.00	178,900
m. Outlet Structure at pond	4	ea	5,000.00	20,000
n. Plug or Remove Culvert under Linden Rd.	1	ea	3,000.00	3,000
Subtotal - Storm Drainage Pipe System				4,394,000
Subtotal Construction and Land Acquisition				9,012,000
15% Contingency				1,351,800
20% Engineering, Surveying, and Contract Administration				1,802,400
Subbasin MC10 Drainage Master Plan				80,000
TOTAL				**12,246,000**

[1]Costs are based upon 2000 price levels.

TABLE B-8

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC11

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	17,000	cy	1.70	28,900
· Haul and Dump Excess Material	17,000	cy	1.10	18,700
· Spread, Compact, and Shape Excess Material	17,000	cy	1.40	23,800
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	34,000	cy	3.40	115,600
· Haul and Dump Excess Material	34,000	cy	1.25	42,500
· Spread, Compact, and Shape Excess Material	34,000	cy	2.70	91,800
b. Dewatering	1	ls	85,000.00	85,000
c. Access Road	1,600	lf	12.00	19,200
d. Hydroseed Pond Slopes	40,000	sf	0.04	1,600
e. Irrigation and Planting	12,800	sf	1.00	12,800
f. Land Acquisition	4.5	ac	40,000.00	180,000
Subtotal - Detention Pond				620,000
2. Pump Station				
a. Pump Station	16	cfs	20,000.00	320,000
b. Gated Outlet Structure at discharge at Main Drain	1	ea	5,000.00	5,000
Subtotal - Pump Station				325,000
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	1,340	lf	116.00	155,400
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	820	lf	143.00	117,300
e. 48" Diameter R.C.P.	1,320	lf	172.00	227,000
f. 54" Diameter R.C.P.	0	lf	204.00	0
g. 60" Diameter R.C.P.	0	lf	238.00	0
h. 66" Diameter R.C.P.	280	lf	275.00	77,000
i. 72" Diameter R.C.P.	0	lf	315.00	0
j. 60" Diameter Manhole	6	ea	2,790.00	16,700
k. 72" Diameter Manhole	6	ea	3,580.00	21,500
l. Saddle Manhole	2	ea	5,590.00	11,200
m. Outlet Structure at pond	2	ea	5,000.00	10,000
Subtotal - Storm Drainage Pipe System				636,100
Subtotal Construction and Land Acquisition				1,581,000
15% Contingency				237,150
20% Engineering, Surveying, and Contract Administration				316,200
Subbasin MC11 Drainage Master Plan				25,000
TOTAL				**2,159,000**

[1]Costs are based upon 2000 price levels.

TABLE B-9

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC20

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	200,000	cy	3.40	680,000
· Haul and Dump Excess Material	200,000	cy	1.25	250,000
· Spread, Compact, and Shape Excess Material	200,000	cy	2.70	540,000
b. Dewatering	1	ls	250,000.00	250,000
c. Access Road	3,100	lf	12.00	37,200
d. Modify Culvert Structure under Southport Parkway Northwest at Lake Washington	1	ls	25,000.00	25,000
e. Hydroseed Pond Slopes	98,000	sf	0.04	3,900
f. Irrigation and Planting	25,000	sf	1.00	25,000
g. Land Acquisition	13.1	ac	40,000.00	524,000
Subtotal - Detention Pond				2,335,000
2. Pump Station				
a. Pump Station	48	cfs	20,000.00	960,000
b. Discharge Pipe, Bore & Jack under Levee	200	lf	545.00	109,000
c. Gated Outlet Structure at discharge at Deep Water Ship Channel	1	ea	5,000.00	5,000
Subtotal - Pump Station				1,074,000
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	2,660	lf	116.00	308,600
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	650	lf	143.00	93,000
e. 48" Diameter R.C.P.	2,780	lf	172.00	478,200
f. 54" Diameter R.C.P.	1,400	lf	204.00	285,600
g. 60" Diameter R.C.P.	0	lf	238.00	0
h. 66" Diameter R.C.P.	920	lf	275.00	253,000
i. 72" Diameter R.C.P.	0	lf	315.00	0
j. 60" Diameter Manhole	7	ea	2,790.00	19,500
k. 72" Diameter Manhole	11	ea	3,580.00	39,400
l. Saddle Manhole	3	ea	5,590.00	16,800
m. Outlet Structure at pond	4	ea	5,000.00	20,000
Subtotal - Storm Drainage Pipe System				1,514,100
Subtotal Construction and Land Acquisition				4,923,000
15% Contingency				738,450
20% Engineering, Surveying, and Contract Administration				984,600
Subbasin MC20 Drainage Master Plan				25,000
TOTAL				**6,671,000**

[1]Costs are based upon 2000 price levels.

TABLE B-10

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC71

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	7,300	cy	1.70	12,400
· Haul and Dump Excess Material	7,300	cy	1.10	8,000
· Spread, Compact, and Shape Excess Material	7,300	cy	1.40	10,200
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	8,500	cy	3.40	28,900
· Haul and Dump Excess Material	8,500	cy	1.25	10,600
· Spread, Compact, and Shape Excess Material	8,500	cy	2.70	23,000
b. Dewatering	1	ls	50,000.00	50,000
c. Access Road	1,030	lf	12.00	12,400
d. Hydroseed Pond Slopes	17,000	sf	0.04	700
e. Irrigation and Planting	8,300	sf	1.00	8,300
f. Land Acquisition	1.5	ac	40,000.00	60,000
Subtotal - Detention Pond				225,000
2. Pump Station				
a. Pump Station	6	cfs	20,000.00	120,000
b. Gated Outlet Structure at discharge at Main Drain	1	ea	5,000.00	5,000
Subtotal - Pump Station				125,000
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	0	lf	116.00	0
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	0	lf	143.00	0
e. 48" Diameter R.C.P.	0	lf	172.00	0
f. 54" Diameter R.C.P.	0	lf	204.00	0
g. 60" Diameter R.C.P.	0	lf	238.00	0
h. 66" Diameter R.C.P.	0	lf	275.00	0
i. 72" Diameter R.C.P.	0	lf	315.00	0
j. 60" Diameter Manhole	0	ea	2,790.00	0
k. 72" Diameter Manhole	0	ea	3,580.00	0
l. Saddle Manhole	0	ea	5,590.00	0
m. Outlet Structure at pond	0	ea	5,000.00	0
Subtotal - Storm Drainage Pipe System				0
Subtotal Construction and Land Acquisition				350,000
15% Contingency				52,500
20% Engineering, Surveying, and Contract Administration				70,000
Subbasin MC71 Drainage Master Plan				15,000
TOTAL				**488,000**

[1]Costs are based upon 2000 price levels.

TABLE B-11

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC80

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	54,000	cy	1.70	91,800
· Haul and Dump Excess Material	54,000	cy	1.10	59,400
· Spread, Compact, and Shape Excess Material	54,000	cy	1.40	75,600
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	210,000	cy	3.40	714,000
· Haul and Dump Excess Material	210,000	cy	1.25	262,500
· Spread, Compact, and Shape Excess Material	210,000	cy	2.70	567,000
b. Dewatering	1	ls	220,000.00	220,000
c. Access Road	2,720	lf	12.00	32,600
d. Hydroseed Pond Slopes	130,000	sf	0.04	5,200
e. Irrigation and Planting	22,000	sf	1.00	22,000
f. Land Acquisition	12.2	ac	40,000.00	488,000
Subtotal - Detention Pond				2,538,000
2. Pump Station				
a. Pump Station	44	cfs	20,000.00	880,000
b. Discharge Pipe, Bore & Jack under Levee	200	lf	545.00	109,000
c. Gated Outlet Structure at discharge at Deep Water Ship Channel	1	ea	5,000.00	5,000
Subtotal - Pump Station				994,000
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	940	lf	116.00	109,000
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	955	lf	143.00	136,600
e. 48" Diameter R.C.P.	2,470	lf	172.00	424,800
f. 54" Diameter R.C.P.	610	lf	204.00	124,400
g. 60" Diameter R.C.P.	1,050	lf	238.00	249,900
h. 66" Diameter R.C.P.	1,200	lf	275.00	330,000
i. 72" Diameter R.C.P.	2,050	lf	315.00	645,800
j. 60" Diameter Manhole	4	ea	2,790.00	11,200
k. 72" Diameter Manhole	6	ea	3,580.00	21,500
l. Saddle Manhole	11	ea	5,590.00	61,500
m. Outlet Structure at pond	2	ea	5,000.00	10,000
Subtotal - Storm Drainage Pipe System				2,124,700
Subtotal Construction and Land Acquisition				5,657,000
15% Contingency				848,550
20% Engineering, Surveying, and Contract Administration				1,131,400
Subbasin MC80 Drainage Master Plan				80,000
TOTAL				**7,717,000**

[1]Costs are based upon 2000 price levels.

TABLE B-12

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN NC10

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	50,000	cy	1.70	85,000
· Haul and Dump Excess Material	50,000	cy	1.10	55,000
· Spread, Compact, and Shape Excess Material	50,000	cy	1.40	70,000
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	120,000	cy	3.40	408,000
· Haul and Dump Excess Material	120,000	cy	1.25	150,000
· Spread, Compact, and Shape Excess Material	120,000	cy	2.70	324,000
b. Dewatering	1	ls	175,000.00	175,000
c. Access Road	2,360	lf	12.00	28,300
d. Hydroseed Pond Slopes	97,000	sf	0.04	3,900
e. Irrigation and Planting	19,000	sf	1.00	19,000
f. Land Acquisition	9.5	ac	40,000.00	380,000
Subtotal - Detention Pond				1,698,000
2. Pump Station				
a. Pump Station	36	cfs	20,000.00	720,000
b. Discharge Pipe, Bore & Jack under RxR	200	lf	545.00	109,000
c. Gated Outlet Structure at discharge at Morton East Drain	1	ea	5,000.00	5,000
Subtotal - Pump Station				834,000
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	2,400	lf	116.00	278,400
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	2,000	lf	143.00	286,000
e. 48" Diameter R.C.P.	0	lf	172.00	0
f. 54" Diameter R.C.P.	540	lf	204.00	110,200
g. 60" Diameter R.C.P.	0	lf	238.00	0
h. 66" Diameter R.C.P.	420	lf	275.00	115,500
i. 72" Diameter R.C.P.	3,220	lf	315.00	1,014,300
j. 60" Diameter Manhole	10	ea	2,790.00	27,900
k. 72" Diameter Manhole	1	ea	3,580.00	3,600
l. Saddle Manhole	14	ea	5,590.00	78,300
m. Outlet Structure at pond	3	ea	5,000.00	15,000
Subtotal - Storm Drainage Pipe System				1,929,200
Subtotal Construction and Land Acquisition				4,461,000
15% Contingency				669,150
20% Engineering, Surveying, and Contract Administration				892,200
Subbasin NC10 Drainage Master Plan				80,000
TOTAL				**6,102,000**

[1]Unit costs are based upon 2000 price levels.

TABLE B-13

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN NC20

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	10,000	cy	1.70	17,000
· Haul and Dump Excess Material	10,000	cy	1.10	11,000
· Spread, Compact, and Shape Excess Material	10,000	cy	1.40	14,000
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	30,000	cy	3.40	102,000
· Haul and Dump Excess Material	30,000	cy	1.25	37,500
· Spread, Compact, and Shape Excess Material	30,000	cy	2.70	81,000
b. Dewatering	1	ls	60,000.00	60,000
c. Access Road	1,270	lf	12.00	15,200
d. Hydroseed Pond Slopes	46,000	sf	0.04	1,800
e. Irrigation and Planting	10,000	sf	1.00	10,000
f. Land Acquisition	3.2	ac	40,000.00	128,000
Subtotal - Detention Pond				478,000
2. Pump Station				
a. Pump Station	10	cfs	20,000.00	200,000
b. Gated Outlet Structure at discharge	1	ea	5,000.00	5,000
Subtotal - Pump Station				205,000
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	1,340	lf	116.00	155,400
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	0	lf	143.00	0
e. 48" Diameter R.C.P.	0	lf	172.00	0
f. 54" Diameter R.C.P.	0	lf	204.00	0
g. 60" Diameter R.C.P.	0	lf	238.00	0
h. 66" Diameter R.C.P.	0	lf	275.00	0
i. 72" Diameter R.C.P.	0	lf	315.00	0
j. 60" Diameter Manhole	4	ea	2,790.00	11,200
k. 72" Diameter Manhole	0	ea	3,580.00	0
l. Saddle Manhole	0	ea	5,590.00	0
m. Outlet Structure at pond	1	ea	5,000.00	5,000
Subtotal - Storm Drainage Pipe System				171,600
Subtotal Construction and Land Acquisition				855,000
15% Contingency				128,250
20% Engineering, Surveying, and Contract Administration				171,000
Subbasin NC20 Drainage Master Plan				25,000
TOTAL				**1,179,000**

[1]Unit costs are based upon 2000 price levels.

TABLE B-14

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN SC10

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	95,000	cy	1.70	161,500
· Haul and Dump Excess Material	95,000	cy	1.10	104,500
· Spread, Compact, and Shape Excess Material	95,000	cy	1.40	133,000
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	80,000	cy	3.40	272,000
· Haul and Dump Excess Material	80,000	cy	1.25	100,000
· Spread, Compact, and Shape Excess Material	80,000	cy	2.70	216,000
b. Dewatering	1	ls	215,000.00	215,000
c. Access Road	2,660	lf	12.00	31,900
d. Hydroseed Pond Slopes	85,000	sf	0.04	3,400
e. Irrigation and Planting	22,000	sf	1.00	22,000
f. Land Acquisition	11.7	ac	40,000.00	468,000
Subtotal - Detention Pond				1,727,000
2. Pump Station				
a. Pump Station	38	cfs	20,000.00	760,000
b. Discharge Pipe, Bore & Jack under RxR	200	lf	545.00	109,000
c. Gated Outlet Structure at discharge at South Drain	1	ea	5,000.00	5,000
Subtotal - Pump Station				874,000
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	1,680	lf	116.00	194,900
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	280	lf	143.00	40,000
e. 48" Diameter R.C.P.	2,300	lf	172.00	395,600
f. 54" Diameter R.C.P.	0	lf	204.00	0
g. 60" Diameter R.C.P.	110	lf	238.00	26,200
h. 66" Diameter R.C.P.	1,500	lf	275.00	412,500
i. 72" Diameter R.C.P.	1,030	lf	315.00	324,500
j. 60" Diameter Manhole	6	ea	2,790.00	16,700
k. 72" Diameter Manhole	5	ea	3,580.00	17,900
l. Saddle Manhole	10	ea	5,590.00	55,900
m. Outlet Structure at pond	3	ea	5,000.00	15,000
Subtotal - Storm Drainage Pipe System				1,499,200
Subtotal Construction and Land Acquisition				4,100,000
15% Contingency				615,000
20% Engineering, Surveying, and Contract Administration				820,000
Subbasin SC10 Drainage Master Plan				80,000
TOTAL				**5,615,000**

[1]Unit costs are based upon 2000 price levels.

TABLE B-15

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN PHASE 1
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC10

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	62,000	cy	1.70	105,400
· Haul and Dump Excess Material	62,000	cy	1.10	68,200
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	16,000	cy	3.40	54,400
· Haul and Dump Excess Material	16,000	cy	1.25	20,000
· Spread, Compact, and Shape Excess Material	0	cy	2.70	0
b. 48" Connector Pipe under Lake Washington Bld.	0	lf	172.00	0
c. Inlet/Outlet Structures at Connector Pipe	0	ea	5,000.00	0
d. Dewatering	1	ls	150,000.00	150,000
e. Access Road	1,300	lf	12.00	15,600
f. Hydroseed Pond Slopes	17,000	sf	0.04	700
g. Irrigation and Planting	13,000	sf	1.00	13,000
h. Land Acquisition	5.0	ac	40,000.00	200,000
Subtotal - Detention Pond				627,000
2. Pump Station				
a. Pump Station	0	cfs	16,500.00	0
b. Discharge Pipe, Bore & Jack under RxR	0	lf	545.00	0
c. Gated Outlet Structure at discharge at Main Drain	0	ea	5,000.00	0
Subtotal - Pump Station				0
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	260	lf	116.00	30,200
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	770	lf	143.00	110,100
e. 48" Diameter R.C.P.	1,250	lf	172.00	215,000
f. 54" Diameter R.C.P.	0	lf	204.00	0
g. 60" Diameter R.C.P.	700	lf	238.00	166,600
h. 66" Diameter R.C.P.	0	lf	275.00	0
i. 72" Diameter R.C.P.	0	lf	315.00	0
j. 60" Diameter Manhole	1	ea	2,790.00	2,800
k. 72" Diameter Manhole	2	ea	3,580.00	7,200
l. Saddle Manhole	8	ea	5,590.00	44,700
m. Outlet Structure at pond	0	ea	5,000.00	0
n. Plug or Remove Culvert under Linden Rd.	0	ea	3,000.00	0
Subtotal - Storm Drainage Pipe System				576,600
Subtotal Construction and Land Acquisition				1,204,000
15% Contingency				180,600
20% Engineering, Surveying, and Contract Administration				240,800
Subbasin MC10 Drainage Master Plan				80,000
TOTAL				**1,705,000**

[1]Unit costs are based upon 2000 price levels.

TABLE B-16

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUMMARY OF OPINIONS OF PROBABLE COST
COMMON DRAINAGE FACILITIES
PREFERRED DRAINAGE PLAN
PHASE 2

Description	Total Cost, $[1]
Common Drainage Facilities Construction Cost	
1. Main Drain Pump Station Improvements	6,807,500
2. Main Drain Channel Improvements	683,700
3. Main Drain Levee Improvements	0
4. Road Crossing Improvements	966,900
5. Maintenance Road Improvements	700,000
Subtotal Construction Cost	9,158,100
Construction Contingencies (25%)	2,289,525
Engineering (20%)	1,831,620
Subtotal	13,279,245
1. Main Drain Pump Station	7,200
Subtotal Land Acquisition Cost [2]	7,200
Land Contingencies (35%)	2,520
Acquisition Allowance (25%)	1,800
Contingency on Acquisition Allowance (25%)	450
Subtotal	11,970
TOTAL	13,291,000

[1]Costs are based upon 2000 price levels.

[2]Land acquisition cost does not include drainage corridor acquisition for Main Drain channel improvements. It is assumed either existing rights-of-way or easements are in place or that lands will be dedicated.

TABLE B-17

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COSTS
COMMON DRAINAGE FACILITIES
PREFERRED DRAINAGE PLAN
PHASE 2

Description	Quantity	Unit	Unit Cost, $	Total Cost, $[1]
Common Drainage Facilities Construction Cost				
1. Main Drain Pump Station Improvements				
a. Demolition of Existing Pump Station	1	ls	125,000.00	125,000
b. Pump Station[2]	405	cfs	16,500.00	6,682,500
Subtotal Main Drain Pump Station Improvements				6,807,500
2. Main Drain Channel Improvements				
a. 6,000 lf with 60 ft Bottom Width				
(1) Cut in Dry Sections				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	49,000	cy	3.40	166,600
· Haul and Dump for Drying	49,000	cy	1.25	61,300
· Spread, Compact, and Shape Excess Material	49,000	cy	2.70	132,300
b. 5,000 lf with 40 ft Bottom Width				
(1) Cut in Dry Sections				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	19,000	cy	3.40	64,600
· Haul and Dump for Drying	19,000	cy	1.25	23,800
· Spread, Compact, and Shape Excess Material	19,000	cy	2.70	51,300
c. 4,000 lf with 30 ft Bottom Width				
(1) Cut in Dry Sections				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2) Cut in Wet Conditions				
· Excavate and Load into Trucks	25,000	cy	3.40	85,000
· Haul and Dump for Drying	25,000	cy	1.25	31,300
· Spread, Compact, and Shape Excess Material	25,000	cy	2.70	67,500
Subtotal Main Drain Channel Improvements				683,700
3. Main Drain Levee Improvements				
a. Levee Improvements				
(1) Clear and Grub for Base				
· Stripping and Vegetation (6")	0	cy	0.80	0
· Subexcavation and Recompaction (12")	0	cy	2.70	0

TABLE B-17

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COSTS
COMMON DRAINAGE FACILITIES
PREFERRED DRAINAGE PLAN
PHASE 2

Description	Quantity	Unit	Unit Cost, $	Total Cost, $[1]
(2) Fill for New Embankment				
· Haul and Dump On-site Dry Material	0	cy	1.10	0
· Compact and Shape On-site Fill Material	0	cy	1.40	0
Subtotal Main Drain Levee Improvements				0
4. Road Crossing Improvements				
a. Main Drain Road Crossings				
(1) Jefferson-1 (4-6x10 Box Culverts)				
· Materials	320	lf	350.00	112,000
· Installation	320	lf	300.00	96,000
· Wing Walls	1	ls	80,000.00	80,000
· Traffic Control	1	ls	30,000.00	30,000
· Pavement Replacement	1,000	sy	40.00	40,000
(2) Jefferson & Bevan (3-6x10 Box Culverts)				
· Materials	360	lf	350.00	126,000
· Installation	360	lf	300.00	108,000
· Wing Walls	1	ls	70,000.00	70,000
· Traffic Control	1	ls	30,000.00	30,000
· Pavement Replacement	1,300	sy	40.00	52,000
(3) Marshall (3-6x8 Box)				
· Materials	150	lf	325.00	48,800
· Installation	150	lf	275.00	41,300
· Wing Walls	1	ls	80,000.00	80,000
· Traffic Control	1	ls	30,000.00	30,000
· Pavement Replacement	570	sy	40.00	22,800
Subtotal Road Crossing Improvements				966,900
5. Maintenance Road Improvements	50,000	lf	14.00	700,000
Subtotal Maintenance Road Improvements				700,000
Total Common Drainage Facilities Construction Cost				9,158,100
Common Drainage Facilities Land Acquisition Cost[3]				
1. Main Drain Pump Station	0.18	ac	40,000.00	7,200
TOTAL COMMON DRAINAGE FACILITIES LAND ACQUISITION	0.18	ac	40,000.00	7,200

[1]Unit costs are based upon 2000 price levels.

[2]Total proposed Main Pump Station Capacity is 550 cfs. Existing three pumps (145 cfs) that were installed in approximately 1979 will remain.

[3]Land acquisition cost does not include drainage corridor acquisition for Main Drain channel improvements. It is assumed either existing rights-of-way or easements are in place or that lands will be dedicated.

TABLE B-18

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN PHASE 2
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC10

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	0	cy	1.70	0
· Haul and Dump Excess Material	0	cy	1.10	0
· Spread, Compact, and Shape Excess Material	0	cy	1.40	0
(2 Cut in Wet Conditions				
· Excavate and Load into Trucks	202,000	cy	3.40	686,800
· Haul and Dump Excess Material	202,000	cy	1.25	252,500
· Spread, Compact, and Shape Excess Material	0	cy	2.70	0
b. 48" Connector Pipe under Lake Washington Bld.	300	lf	172.00	51,600
c. Inlet/Outlet Structures at Connector Pipe	2	ea	5,000.00	10,000
d. Dewatering	1	ls	150,000.00	150,000
e. Access Road	4,300	lf	12.00	51,600
f. Hydroseed Pond Slopes	56,000	sf	0.04	2,200
g. Irrigation and Planting	47,000	sf	1.00	47,000
h. Land Acquisition	12.0	ac	40,000.00	480,000
Subtotal - Detention Pond				1,732,000
2. Pump Station				
a. Pump Station (Ult. Site and Structure Improv.'s w/ 65-cfs pump capacity)	1	ls	1,850,000.00	1,850,000
b. Discharge Pipe, Bore & Jack under RxR	200	lf	545.00	109,000
c. Gated Outlet Structure at discharge at Main Drain	1	ea	5,000.00	5,000
Subtotal - Pump Station				1,964,000
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	1,060	lf	116.00	123,000
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	1,510	lf	143.00	215,900
e. 48" Diameter R.C.P.	2,010	lf	172.00	345,700
f. 54" Diameter R.C.P.	0	lf	204.00	0
g. 60" Diameter R.C.P.	0	lf	238.00	0
h. 66" Diameter R.C.P.	3,420	lf	275.00	940,500
i. 72" Diameter R.C.P.	4,490	lf	315.00	1,414,400
j. 60" Diameter Manhole	6	ea	2,790.00	16,700
k. 72" Diameter Manhole	5	ea	3,580.00	17,900
l. Saddle Manhole	22	ea	5,590.00	123,000
m. Outlet Structure at pond	4	ea	5,000.00	20,000
n. Plug or Remove Culvert under Linden Rd.	1	ea	3,000.00	3,000
Subtotal - Storm Drainage Pipe System				3,220,100
Subtotal Construction and Land Acquisition				6,916,000
15% Contingency				1,037,400
20% Engineering, Surveying, and Contract Administration				1,383,200
TOTAL				**9,337,000**

[1]Unit costs are based upon 2000 price levels.

TABLE B-19

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

OPINION OF PROBABLE COST
PREFERRED DRAINAGE PLAN PHASE 2
SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC80

Description	Quantity	Unit	Unit Cost, $[1]	Cost, $
1. Detention Pond				
a. Excavation				
(1) Cut in Dry Conditions				
· Excavate and Load into Trucks	54,000	cy	1.70	91,800
· Haul and Dump Excess Material	54,000	cy	1.10	59,400
· Spread, Compact, and Shape Excess Material	54,000	cy	1.40	75,600
(2 Cut in Wet Conditions				
· Excavate and Load into Trucks	210,000	cy	3.40	714,000
· Haul and Dump Excess Material	210,000	cy	1.25	262,500
· Spread, Compact, and Shape Excess Material	210,000	cy	2.70	567,000
b. Dewatering	1	ls	220,000.00	220,000
c. Access Road	2,720	lf	12.00	32,600
d. Hydroseed Pond Slopes	130,000	sf	0.04	5,200
e. Irrigation and Planting	22,000	sf	1.00	22,000
f. Land Acquisition	12.2	ac	40,000.00	488,000
Subtotal - Detention Pond				2,538,000
2. Pump Station				
a. Pump Station	22	cfs	20,000.00	440,000
b. Discharge Pipe, Bore & Jack under Levee	200	lf	545.00	109,000
c. Gated Outlet Structure at discharge at Deep Water Ship Channel	1	ea	5,000.00	5,000
Subtotal - Pump Station				554,000
3. Storm Drainage Pipe System				
a. 33" Diameter R.C.P.	0	lf	104.00	0
b. 36" Diameter R.C.P.	40	lf	116.00	4,600
c. 39" Diameter R.C.P.	0	lf	129.00	0
d. 42" Diameter R.C.P.	0	lf	143.00	0
e. 48" Diameter R.C.P.	1,870	lf	172.00	321,600
f. 54" Diameter R.C.P.	610	lf	204.00	124,400
g. 60" Diameter R.C.P.	1,050	lf	238.00	249,900
h. 66" Diameter R.C.P.	1,200	lf	275.00	330,000
i. 72" Diameter R.C.P.	2,050	lf	315.00	645,800
j. 60" Diameter Manhole	4	ea	2,790.00	11,200
k. 72" Diameter Manhole	6	ea	3,580.00	21,500
l. Saddle Manhole	11	ea	5,590.00	61,500
m. Outlet Structure at pond	2	ea	5,000.00	10,000
Subtotal - Storm Drainage Pipe System				1,780,500
Subtotal Construction and Land Acquisition				4,873,000
15% Contingency				730,950
20% Engineering, Surveying, and Contract Administration				974,600
Subbasin MC80 Drainage Master Plan				80,000
TOTAL				**6,659,000**

[1]Unit costs are based upon 2000 price levels.

Appendix C

COST ALLOCATIONS AND DRAINAGE FEES

TABLE C-1

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

ULTIMATE LAND USE

Land Use	Area (Acres)																												Total
	Subbasin																												
	MC10	MC11	MC20	MC30	MC50	MC60	MC70	MC71	MC72	MC73	MC74	MC75	MC76	MC80	MC81	MC90	MC91	MC92	MC100	MC110	NC10	NC11	NC20	NC21	NC22	NC23	SC10	SC11	
PROPOSED DEVELOPMENT[1]																													
Rural Estates (RE)							202.74			37.51	70.24	24.81			254.82													44.47	635
Rural Residential (RR)	90.8						13			13.97											33.65	44.3			81.39	65.28		28.58	371
Low Density Residential (LR)	277.8					205.2		30						308.3							215.19		58.77				337.79		1,433
Medium Density Residential (MR)	205.6			30.43		113.8								128.02							58.83		17.5				31.32		586
High Density Residential (HR)	61.3			22.02		28.9								20.62							50.72						24.16		208
High Rise Residential (HRR)																													0
Neighborhood Commercial (NC)	7		5.3			13.4	1.57							13.02							7.27					13.18	6.57		67
Community Comercial (CC)				9.75																									10
Water Related Commercial (WRC)						87																							87
General Commercial (GC)		22.23																											22
Business Park (BP)			117			113.2																							230
Mixed Use (MU)	34.8					8.8																							44
Riverfront Mixed Use (RMU)	25.8	68.09	10																										104
Light Industrial (LI)			9.8			144.8																							155
Heavy Industrial (HI)						301.7																							302
Water Related Industrial (WRI)	14.9		194																										209
Public/Quasi-Public (PQP)	18.7					10.8								39.62							33.69						7.63		110
Recreation and Park (RP)	41.6		26.7											19.77				0.63			24.89						9.56		123
Open Space (OS)	17.2	4.5	54	7.2		67.4		3		10.33	9.73			15.28							20.22		3.2				33.31		245
EXISTING DEVELOPMENT[2]																													
Rural Estates (RE)							48.5			9.6			7.5										7.72		14.4	2.50			90
Rural Residential (RR)	42				9.12		82.7			18.9														83.51		33.70		34.00	304
Low Density Residential (LR)	37		46		221.46																								304
Medium Density Residential (MR)				76																									76
Commercial (NC, CC, and GC)		6.9			4.41																					16.53			28
Public/Quasi-Public (PQP)	2			12.23																									14
Recreation/Park/Open Space (RP & OS)				7.1	16.77																								24
Agriculture (AG)									61.37				108.93			99.05	93.56	57.31	353.99	193.05									967
TOTAL	876.5	101.72	462.8	164.73	251.76	1095	348.51	33	61.37	90.31	79.97	24.81	116.43	544.63	254.82	99.05	93.56	57.94	353.99	193.05	444.46	44.3	87.19	83.51	95.79	131.19	450.34	107.05	6,748

[1]Proposed development is based upon the City of West Sacramento Southport Land Use Plan, 2000.

[2]Existing development is defined as development that exists in the 2000 Condition excluding Southport Business Park Project and Bridgeway Island Project.

TABLE C-2

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

ALLOCATION OF BENEFITS BY LAND USE
FOR COMMON DRAINAGE FACILITIES

Land Use	Area (acres)	DUE Factor[1]	Total DUE's[2]	Cost per DUE[3] ($)	Allocated Cost[4] ($)	Cost Per Acre[5] ($)
PROPOSED DEVELOPMENT[6]						
Rural Estates (RE)	635	0.4	253.84	1,007	255,537	403
Rural Residential (RR)	371	0.8	296.78	1,007	298,765	805
Low Density Residential (LR)	1,228	4.0	4911.40	1,007	4,944,316	4,027
Medium Density Residential (MR)	472	7.0	3301.90	1,007	3,324,029	7,047
High Density Residential (HR)	179	10	1788.20	1,007	1,800,184	10,067
High Rise Residential (HRR)	0	10	0.00	1,007	0	
Neighborhood Commercial (NC)	54	10	539.10	1,007	542,713	10,067
Community Comercial (CC)	10	10	97.50	1,007	98,153	10,067
Water Related Commercial (WRC)	0	10	0.00	1,007	0	
General Commercial (GC)	22	10	222.30	1,007	223,790	10,067
Business Park (BP)	117	10	1170.00	1,007	1,177,841	10,067
Mixed Use (MU)	35	10	348.00	1,007	350,332	10,067
Riverfront Mixed Use (RMU)	104	10	1038.90	1,007	1,045,863	10,067
Light Industrial (LI)	10	10	98.00	1,007	98,657	10,067
Heavy Industrial (HI)	0	10	0.00	1,007	0	
Water Related Industrial (WRI)	209	10	2089.00	1,007	2,103,000	10,067
Public/Quasi-Public (PQP)	100	7.0	697.48	1,007	702,154	7,047
Recreation and Park (RP)	123	0.0	0.00	1,007	0	0
Open Space (OS)	178	0.0	0.00	1,007	0	0
Subbasin MC60 [7]	1,095				1,591,665	
TOTAL	4,940		16,852		18,557,000	

[1]DUE factor is the dwelling unit equivalent factor. For residential land uses excluding High Density Residential and High Rise Residential, the DUE factor is based upon the average density included in the "Draft City of West Sacramento Southport Framework Plan Preliminary Financing Plan Dated October 17, 1994. For Non-residential, High Density Residential, and High Rise Residential land uses, the DUE factor is based upon the ratio of the runoff coefficients to DUE's for the average of the Low Density Residential and Medium Density Residential values to Commercial values.

[2]Total DUE's is calculated by multiplying the area by the DUE factor.

[3]Cost per DUE is calculated by dividing the total cost by the total number of DUE's.

[4]Allocated cost for each land use type is calculated by multiplying the DUE's for each land type by the cost per DUE.

[5]Cost per acre for each land use type is calculated by dividing the allocated cost for each land use type by the area for that land use type.

[6]Proposed development is based upon the City of West Sacrmento Southport Area Land Use Plan, 2000. Land uses within Subbasin MC60 are separated into one line item.

[7]Subbasin MC60 has an existing development agreement that establishes the Subbasin MC60 cost allocation for common drainage facilities.

TABLE C-3

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

COST ALLOCATION BY LAND USE
FOR SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC10

LAND USE	ALLOCATION FACTOR [1]	AREA (ACRES)	TOTAL ALLOCATION UNITS	WEIGHTED BENEFIT [2]	ALLOCATED COST [3]
PROPOSED DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00	90.8	0.00	0.00%	0
Low Density Residential (LR)	0.45	277.8	125.01	35.02%	4,288,891
Medium Density Residential (MR)	0.51	205.6	104.86	29.38%	3,597,440
High Density Residential (HR)	0.71	61.3	43.52	12.19%	1,493,204
High Rise Residential (HRR)	0.71				
Neighborhood Commercial (NC)	0.84	7	5.88	1.65%	201,733
Community Comercial (CC)	0.84				
Water Related Commercial (WRC)	0.84				
General Commercial (GC)	0.64				
Business Park (BP)	0.84				
Mixed Use (MU)	0.64	34.8	22.27	6.24%	764,116
Riverfront Mixed Use (RMU)	0.64	25.8	16.51	4.63%	566,500
Light Industrial (LI)	0.80				
Heavy Industrial (HI)	0.80				
Water Related Industrial (WRI)	0.80	14.9	11.92	3.34%	408,956
Public/Quasi-Public (PQP)	0.58	18.7	10.85	3.04%	372,109
Recreation and Park (RP)	0.28	41.6	11.65	3.26%	399,624
Open Space (OS)	0.26	17.2	4.47	1.25%	153,427
EXISTING DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00	42	0.00	0.00%	0
Low Density Residential (LR)	0.00	37	0.00	0.00%	0
Medium Density Residential (MR)	0.00				
Commercial (NC, CC, and GC)	0.00				
Public/Quasi-Public (PQP)	0.00	2	0.00	0.00%	0
Recreation/Park/Open Space (RP & OS)	0.00				
Agriculture (AG)	0.00				
Totals		876.5	356.939	100.00%	12,246,000

[1]Except for Rural Estates and Rural Residential land use types, the allocation factor is equal to the runoff coefficient for the Rational Method. The runoff coefficients reflect hydrologic soil group C and were obtained from the report entitled, "The City of West Sacramento, Storm Drainage Design Standards, Section 4.11, Draft," dated October 30, 1995. Rural Estates and Rural Residential land use types are exempt from subbasin specific drainage facilities cost allocations.

[2]Weighted benefit for each land use type is calcualted as "Total Allocation Units" divided by the sum of "Total Allocation Units" and multiplied by 100.

[3]Allocated Cost for each land use is calculated by multiplying the subbasin drainage facilities cost by the weighted benefit percentage for nonexempt land use only.

TABLE C-4

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

COST ALLOCATION BY LAND USE
FOR SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC11

LAND USE	ALLOCATION FACTOR [1]	AREA (ACRES)	TOTAL ALLOCATION UNITS	WEIGHTED BENEFIT [2]	ALLOCATED COST [3]
PROPOSED DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.45				
Medium Density Residential (MR)	0.51				
High Density Residential (HR)	0.71				
High Rise Residential (HRR)	0.71				
Neighborhood Commercial (NC)	0.84				
Community Comercial (CC)	0.84				
Water Related Commercial (WRC)	0.84				
General Commercial (GC)	0.64	22.23	14.23	24.12%	520,842
Business Park (BP)	0.84				
Mixed Use (MU)	0.64				
Riverfront Mixed Use (RMU)	0.64	68.09	43.58	73.89%	1,595,326
Light Industrial (LI)	0.80				
Heavy Industrial (HI)	0.80				
Water Related Industrial (WRI)	0.80				
Public/Quasi-Public (PQP)	0.58				
Recreation and Park (RP)	0.28				
Open Space (OS)	0.26	4.5	1.17	1.98%	42,832
EXISTING DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.00				
Medium Density Residential (MR)	0.00				
Commercial (NC, CC, and GC)	0.00	6.9	0.00	0.00%	0
Public/Quasi-Public (PQP)	0.00				
Recreation/Park/Open Space (RP & OS)	0.00				
Agriculture (AG)	0.00				
Totals		101.72	58.9748	100.00%	2,159,000

[1]Except for Rural Estates and Rural Residential land use types, the allocation factor is equal to the runoff coefficient for the Rational Method. The runoff coefficients reflect hydrologic soil group C and were obtained from the report entitled, "The City of West Sacramento, Storm Drainage Design Standards, Section 4.11, Draft," dated October 30, 1995. Rural Estates and Rural Residential land use types are exempt from subbasin specific drainage facilities cost allocations.

[2]Weighted benefit for each land use type is calcualted as "Total Allocation Units" divided by the sum of "Total Allocation Units" and multiplied by 100.

[3]Allocated Cost for each land use is calculated by multiplying the subbasin drainage facilities cost by the weighted benefit percentage for nonexempt land use only.

TABLE C-5

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

COST ALLOCATION BY LAND USE
FOR SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC20

LAND USE	ALLOCATION FACTOR [1]	AREA (ACRES)	TOTAL ALLOCATION UNITS	WEIGHTED BENEFIT [2]	ALLOCATED COST [3]
PROPOSED DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.45				
Medium Density Residential (MR)	0.51				
High Density Residential (HR)	0.71				
High Rise Residential (HRR)	0.71				
Neighborhood Commercial (NC)	0.84	5.3	4.45	1.52%	101,125
Community Comercial (CC)	0.84				
Water Related Commercial (WRC)	0.84				
General Commercial (GC)	0.64				
Business Park (BP)	0.84	117	98.28	33.46%	2,232,389
Mixed Use (MU)	0.64				
Riverfront Mixed Use (RMU)	0.64	10	6.40	2.18%	145,373
Light Industrial (LI)	0.80	9.8	7.84	2.67%	178,082
Heavy Industrial (HI)	0.80				
Water Related Industrial (WRI)	0.80	194	155.20	52.85%	3,525,303
Public/Quasi-Public (PQP)	0.58				
Recreation and Park (RP)	0.28	26.7	7.48	2.55%	169,814
Open Space (OS)	0.26	54	14.04	4.78%	318,913
EXISTING DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.00	46	0.00	0.00%	0
Medium Density Residential (MR)	0.00				
Commercial (NC, CC, and GC)	0.00				
Public/Quasi-Public (PQP)	0.00				
Recreation/Park/Open Space (RP & OS)	0.00				
Agriculture (AG)	0.00				
Totals		462.8	293.688	100.00%	6,671,000.00

[1]Except for Rural Estates and Rural Residential land use types, the allocation factor is equal to the runoff coefficient for the Rational Method. The runoff coefficients reflect hydrologic soil group C and were obtained from the report entitled, "The City of West Sacramento, Storm Drainage Design Standards, Section 4.11, Draft," dated October 30, 1995. Rural Estates and Rural Residential land use types are exempt from subbasin specific drainage facilities cost allocations.

[2]Weighted benefit for each land use type is calcualted as "Total Allocation Units" divided by the sum of "Total Allocation Units" and multiplied by 100.

[3]Allocated Cost for each land use is calculated by multiplying the subbasin drainage facilities cost by the weighted benefit percentage for nonexempt land use only.

TABLE C-6

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

COST ALLOCATION BY LAND USE
FOR SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC71

LAND USE	ALLOCATION FACTOR [1]	AREA (ACRES)	TOTAL ALLOCATION UNITS	WEIGHTED BENEFIT [2]	ALLOCATED COST [3]
PROPOSED DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.45	30	13.50	94.54%	461,345
Medium Density Residential (MR)	0.51				
High Density Residential (HR)	0.71				
High Rise Residential (HRR)	0.71				
Neighborhood Commercial (NC)	0.84				
Community Comercial (CC)	0.84				
Water Related Commercial (WRC)	0.84				
General Commercial (GC)	0.64				
Business Park (BP)	0.84				
Mixed Use (MU)	0.64				
Riverfront Mixed Use (RMU)	0.64				
Light Industrial (LI)	0.80				
Heavy Industrial (HI)	0.80				
Water Related Industrial (WRI)	0.80				
Public/Quasi-Public (PQP)	0.58				
Recreation and Park (RP)	0.28				
Open Space (OS)	0.26	3	0.78	5.46%	26,655
EXISTING DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.00				
Medium Density Residential (MR)	0.00				
Commercial (NC, CC, and GC)	0.00				
Public/Quasi-Public (PQP)	0.00				
Recreation/Park/Open Space (RP & OS)	0.00				
Agriculture (AG)	0.00				
Totals		33	14.28	100.00%	488,000.00

[1]Except for Rural Estates and Rural Residential land use types, the allocation factor is equal to the runoff coefficient for the Rational Method. The runoff coefficients reflect hydrologic soil group C and were obtained from the report entitled, "The City of West Sacramento, Storm Drainage Design Standards, Section 4.11, Draft," dated October 30, 1995. Rural Estates and Rural Residential land use types are exempt from subbasin specific drainage facilities cost allocations.

[2]Weighted benefit for each land use type is calcualted as "Total Allocation Units" divided by the sum of "Total Allocation Units" and multiplied by 100.

[3]Allocated Cost for each land use is calculated by multiplying the subbasin drainage facilities cost by the weighted benefit percentage for nonexempt land use only.

TABLE C-7

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

COST ALLOCATION BY LAND USE
FOR SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN MC80

LAND USE	ALLOCATION FACTOR [1]	AREA (ACRES)	TOTAL ALLOCATION UNITS	WEIGHTED BENEFIT [2]	ALLOCATED COST [3]
PROPOSED DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.45	308.3	138.74	52.93%	4,084,922
Medium Density Residential (MR)	0.51	128.02	65.29	24.91%	1,922,409
High Density Residential (HR)	0.71	20.62	14.64	5.59%	431,067
High Rise Residential (HRR)	0.71				
Neighborhood Commercial (NC)	0.84	13.02	10.94	4.17%	322,024
Community Comercial (CC)	0.84				
Water Related Commercial (WRC)	0.84				
General Commercial (GC)	0.64				
Business Park (BP)	0.84				
Mixed Use (MU)	0.64				
Riverfront Mixed Use (RMU)	0.64				
Light Industrial (LI)	0.80				
Heavy Industrial (HI)	0.80				
Water Related Industrial (WRI)	0.80				
Public/Quasi-Public (PQP)	0.58	39.62	22.98	8.77%	676,613
Recreation and Park (RP)	0.28	19.77	5.54	2.11%	162,991
Open Space (OS)	0.26	15.28	3.97	1.52%	116,975
EXISTING DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.00				
Medium Density Residential (MR)	0.00				
Commercial (NC, CC, and GC)	0.00				
Public/Quasi-Public (PQP)	0.00				
Recreation/Park/Open Space (RP & OS)	0.00				
Agriculture (AG)	0.00				
Totals		544.63	262.0902	100.00%	7,717,000

[1]Except for Rural Estates and Rural Residential land use types, the allocation factor is equal to the runoff coefficient for the Rational Method. The runoff coefficients reflect hydrologic soil group C and were obtained from the report entitled, "The City of West Sacramento, Storm Drainage Design Standards, Section 4.11, Draft," dated October 30, 1995. Rural Estates and Rural Residential land use types are exempt from subbasin specific drainage facilities cost allocations.

[2]Weighted benefit for each land use type is calcualted as "Total Allocation Units" divided by the sum of "Total Allocation Units" and multiplied by 100.

[3]Allocated Cost for each land use is calculated by multiplying the subbasin drainage facilities cost by the weighted benefit percentage for nonexempt land use only.

TABLE C-8

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

COST ALLOCATION BY LAND USE
FOR SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN NC10

LAND USE	ALLOCATION FACTOR [1]	AREA (ACRES)	TOTAL ALLOCATION UNITS	WEIGHTED BENEFIT [2]	ALLOCATED COST [3]
PROPOSED DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00	33.65	0.00	0.00%	0
Low Density Residential (LR)	0.45	215.19	96.84	48.24%	2,943,803
Medium Density Residential (MR)	0.51	58.83	30.00	14.95%	912,102
High Density Residential (HR)	0.71	50.72	36.01	17.94%	1,094,742
High Rise Residential (HRR)	0.71				
Neighborhood Commercial (NC)	0.84	7.27	6.11	3.04%	185,647
Community Comercial (CC)	0.84				
Water Related Commercial (WRC)	0.84				
General Commercial (GC)	0.64				
Business Park (BP)	0.84				
Mixed Use (MU)	0.64				
Riverfront Mixed Use (RMU)	0.64				
Light Industrial (LI)	0.80				
Heavy Industrial (HI)	0.80				
Water Related Industrial (WRI)	0.80				
Public/Quasi-Public (PQP)	0.58	33.69	19.54	9.73%	594,023
Recreation and Park (RP)	0.28	24.89	6.97	3.47%	211,864
Open Space (OS)	0.26	20.22	5.26	2.62%	159,819
EXISTING DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.00				
Medium Density Residential (MR)	0.00				
Commercial (NC, CC, and GC)	0.00				
Public/Quasi-Public (PQP)	0.00				
Recreation/Park/Open Space (RP & OS)	0.00				
Agriculture (AG)	0.00				
Totals		444.46	200.7234	100.00%	6,102,000

[1]Except for Rural Estates and Rural Residential land use types, the allocation factor is equal to the runoff coefficient for the Rational Method. The runoff coefficients reflect hydrologic soil group C and were obtained from the report entitled, "The City of West Sacramento, Storm Drainage Design Standards, Section 4.11, Draft," dated October 30, 1995. Rural Estates and Rural Residential land use types are exempt from subbasin specific drainage facilities cost allocations.

[2]Weighted benefit for each land use type is calcualted as "Total Allocation Units" divided by the sum of "Total Allocation Units" and multiplied by 100.

[3]Allocated Cost for each land use is calculated by multiplying the subbasin drainage facilities cost by the weighted benefit percentage for nonexempt land use only.

TABLE C-9

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

COST ALLOCATION BY LAND USE
FOR SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN NC20

LAND USE	ALLOCATION FACTOR [1]	AREA (ACRES)	TOTAL ALLOCATION UNITS	WEIGHTED BENEFIT [2]	ALLOCATED COST [3]
PROPOSED DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.45	58.77	26.45	73.05%	861,254
Medium Density Residential (MR)	0.51	17.5	8.93	24.65%	290,651
High Density Residential (HR)	0.71				
High Rise Residential (HRR)	0.71				
Neighborhood Commercial (NC)	0.84				
Community Comercial (CC)	0.84				
Water Related Commercial (WRC)	0.84				
General Commercial (GC)	0.64				
Business Park (BP)	0.84				
Mixed Use (MU)	0.64				
Riverfront Mixed Use (RMU)	0.64				
Light Industrial (LI)	0.80				
Heavy Industrial (HI)	0.80				
Water Related Industrial (WRI)	0.80				
Public/Quasi-Public (PQP)	0.58				
Recreation and Park (RP)	0.28				
Open Space (OS)	0.26	3.2	0.83	2.30%	27,095
EXISTING DEVELOPMENT					
Rural Estates (RE)	0.00	7.72	0.00	0.00%	0
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.00				
Medium Density Residential (MR)	0.00				
Commercial (NC, CC, and GC)	0.00				
Public/Quasi-Public (PQP)	0.00				
Recreation/Park/Open Space (RP & OS)	0.00				
Agriculture (AG)	0.00				
Totals		87.19	36.2035	100.00%	1,179,000

[1]Except for Rural Estates and Rural Residential land use types, the allocation factor is equal to the runoff coefficient for the Rational Method. The runoff coefficients reflect hydrologic soil group C and were obtained from the report entitled, "The City of West Sacramento, Storm Drainage Design Standards, Section 4.11, Draft," dated October 30, 1995. Rural Estates and Rural Residential land use types are exempt from subbasin specific drainage facilities cost allocations.

[2]Weighted benefit for each land use type is calcualted as "Total Allocation Units" divided by the sum of "Total Allocation Units" and multiplied by 100.

[3]Allocated Cost for each land use is calculated by multiplying the subbasin drainage facilities cost by the weighted benefit percentage for nonexempt land use only.

TABLE C-10

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

COST ALLOCATION BY LAND USE
FOR SUBBASIN SPECIFIC DRAINAGE FACILITIES
SUBBASIN SC10

LAND USE	ALLOCATION FACTOR [1]	AREA (ACRES)	TOTAL ALLOCATION UNITS	WEIGHTED BENEFIT [2]	ALLOCATED COST [3]
PROPOSED DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.45	337.79	152.01	73.64%	4,134,949
Medium Density Residential (MR)	0.51	31.32	15.97	7.74%	434,513
High Density Residential (HR)	0.71	24.16	17.15	8.31%	466,623
High Rise Residential (HRR)	0.71				
Neighborhood Commercial (NC)	0.84	6.57	5.52	2.67%	150,126
Community Comercial (CC)	0.84				
Water Related Commercial (WRC)	0.84				
General Commercial (GC)	0.64				
Business Park (BP)	0.84				
Mixed Use (MU)	0.64				
Riverfront Mixed Use (RMU)	0.64				
Light Industrial (LI)	0.80				
Heavy Industrial (HI)	0.80				
Water Related Industrial (WRI)	0.80				
Public/Quasi-Public (PQP)	0.58	7.63	4.43	2.14%	120,382
Recreation and Park (RP)	0.28	9.56	2.68	1.30%	72,816
Open Space (OS)	0.26	33.31	8.66	4.20%	235,591
EXISTING DEVELOPMENT					
Rural Estates (RE)	0.00				
Rural Residential (RR)	0.00				
Low Density Residential (LR)	0.00				
Medium Density Residential (MR)	0.00				
Commercial (NC, CC, and GC)	0.00				
Public/Quasi-Public (PQP)	0.00				
Recreation/Park/Open Space (RP & OS)	0.00				
Agriculture (AG)	0.00				
Totals		450.34	206.4139	100.00%	5,615,000

[1]Except for Rural Estates and Rural Residential land use types, the allocation factor is equal to the runoff coefficient for the Rational Method. The runoff coefficients reflect hydrologic soil group C and were obtained from the report entitled, "The City of West Sacramento, Storm Drainage Design Standards, Section 4.11, Draft," dated October 30, 1995. Rural Estates and Rural Residential land use types are exempt from subbasin specific drainage facilities cost allocations.

[2]Weighted benefit for each land use type is calcualted as "Total Allocation Units" divided by the sum of "Total Allocation Units" and multiplied by 100.

[3]Allocated Cost for each land use is calculated by multiplying the subbasin drainage facilities cost by the weighted benefit percentage for nonexempt land use only.

TABLE C-11

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

EXEMPT LAND COST ALLOCATION AND DRAINAGE FEE

Land Use	Exempt Land Cost Allocation ($)								
	Subbasin [1,2]								Total
	MC10	MC11	MC20	MC71	MC80	NC10	NC20	SC10	
PROPOSED DEVELOPMENT									
Recreation and Park (RP)	399,624		169,814		162,991	211,864		72,816	1,017,109
Open Space (OS)	153,427	42,832	318,913	26,655	116,975	159,819	27,095	235,591	1,081,308
Totals	553,051	42,832	488,727	26,655	279,966	371,683	27,095	308,407	2,098,417

Total Southport Area Excluding Existing Development=	4,940 Acres
Total Southport Non-Exempt Area Excluding Existing Development=	4,571 Acres
Total Southport Area (excluding Subbasin MC60) Excluding Existing Development=	3,845 Acres
Total Southport Non-Exempt Area (excluding Subbasin MC60) Excluding Existing Development=	3,544 Acres
Exempt Land Cost Drainage Fee (for Non-Exempt Lands only, excluding Subbasin MC60 and Existing Development) =	$592.13 Per Acre

[1]Subbasin MC60 is not participating in the spread of the costs for exempt land throughout Southport. Subbasin MC60 will fund all cost allocations for exempt land uses within Subbasin MC60 and will not fund any portion of cost allocations for exempt land uses outside of MC60.

[2]Subbasin MC30 has an existing pond and pump station. Subbasin MC30 will fund all cost allocations for exempt land uses within Subbasin MC30.

TABLE C-12

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC10

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)	90.8	0	0	805	73,127	592	53,765	126,892	1,397
Low Density Residential (LR)	277.8	4,288,891	15,439	4,027	1,118,647	592	164,493	5,572,032	20,058
Medium Density Residential (MR)	205.6	3,597,440	17,497	7,047	1,448,845	592	121,742	5,168,027	25,136
High Density Residential (HR)	61.3	1,493,204	24,359	10,067	617,108	592	36,298	2,146,610	35,018
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)	7	201,733	28,819	10,067	70,469	592	4,145	276,347	39,478
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)	34.8	764,116	21,957	10,067	350,332	592	20,606	1,135,055	32,617
Riverfront Mixed Use (RMU)	25.8	566,500	21,957	10,067	259,729	592	15,277	841,506	32,617
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)	14.9	408,956	27,447	10,067	149,999	592	8,823	567,777	38,106
Public/Quasi-Public (PQP)	18.7	372,109	19,899	7,047	131,777	592	11,073	514,959	27,538
Recreation and Park (RP)	41.6	0	0	0	0	0	0	0	0
Open Space (OS)	17.2	0	0	0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)	42	0	0	0	0	0	0	0	0
Low Density Residential (LR)	37	0	0	0	0	0	0	0	0
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)	2	0	0	0	0	0	0	0	0
Recreation/Park/Open Space (RP & OS)		0	0	0		0			
Agriculture (AG)		0	0	0		0			
Totals	876.5	11,692,949			4,220,034		436,222	16,349,204	

TABLE C-13

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC11

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)	22.23	520,842	23,430	10,067	223,790	592	13,163	757,794	34,089
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)	68.09	1,595,326	23,430	10,067	685,463	592	40,318	2,321,108	34,089
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)		0		0		0			
Open Space (OS)	4.5	0	0	0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)	6.9	0	0	0	0	0	0	0	0
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)		0		0		0			
Agriculture (AG)		0		0		0			
Totals	101.72	2,116,168			909,253		53,481	3,078,902	

TABLE C-14

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC20

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)	5.3	101,125	19,080	10,067	53,355	592	3,138	157,619	29,739
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)	117	2,232,389	19,080	10,067	1,177,841	592	69,279	3,479,509	29,739
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)	10	145,373	14,537	10,067	100,670	592	5,921	251,965	25,196
Light Industrial (LI)	9.8	178,082	18,172	10,067	98,657	592	5,803	282,542	28,831
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)	194	3,525,303	18,172	10,067	1,953,002	592	114,873	5,593,178	28,831
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)	26.7	0	0	0	0	0	0	0	0
Open Space (OS)	54	0	0	0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)	46	0	0	0	0	0	0	0	0
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)		0		0		0			
Agriculture (AG)		0		0		0			
Totals	462.8	6,182,273			3,383,525		199,015	9,764,813	

TABLE C-15

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC30

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE [1]	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)	30.43		0	7,047	214,438	592	18,018	232,456	7,639
High Density Residential (HR)	22.02		0	10,067	221,676	592	13,039	234,714	10,659
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)	9.75		0	10,067	98,153	592	5,773	103,927	10,659
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)	7.2		0	0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)	76		0	0	0	0	0	0	0
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)	12.23		0	0	0	0	0	0	0
Recreation/Park/Open Space (RP & OS)	7.1		0	0	0	0	0	0	0
Agriculture (AG)				0		0			
Totals	164.73	0			534,267		36,830	571,097	

[1]Costs and fees for subbasin specific drainage facilities for Subbasin MC30 are not included. The Pheasant Hollow subdivision, within Subbasin MC30, has proposed a plan to drain to Touchstone Lake and the existing pump station. The cost for the storm drainage conveyance system, additional detention capacity if needed, and improvements to the existing pump station are assumed to be funded by the proposed development.

TABLE C-16

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC50

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE [1]	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)	9.12			0	0	0	0	0	0
Low Density Residential (LR)	221.46			0	0	0	0	0	0
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)	4.41			0	0	0	0	0	0
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)	16.77			0	0	0	0	0	0
Agriculture (AG)				0		0			
Totals	251.76	0			0		0	0	

[1] Subbasin Specific Drianage Facilities for Subbasin MC50 are not included.

TABLE C-17

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC60

	Area (Acres)	Subbasin Specific Drainage Facilities [3] Total Fee ($)	Common Drainage Facilities [1] Total Fee ($)	Exempt Land Cost [2] Total Fee ($)	Total [3] Total Fee ($)
Totals	1095	0	1,591,665	0	1,591,665

[1]Existing Development Agreements are in place for Subbasin MC60. The Development Agreements establish Subbasin MC60's cost allocation for common drainage facilities.

[2]Projects within Subbasin MC60 are not participating in the spread of the costs for exempt land throughout Southport. Projects within Subbasin MC60 will fund all cost allocations for exempt land uses within Subbasin MC60 and will not fund any portion of cost allocations for exempt land uses outside of Subbasin MC60.

[3]The Subbasin Specific Drainage Facilities Costs for Subbasin MC60 are not specified in this report. Therefore, the total drainage fee for MC60 does not reflect the Subbasin Specific Drainage Facilities portion of the fee.

TABLE C-18

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC70

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)	202.74			403	81,639	592	120,048	201,688	995
Rural Residential (RR)	13			805	10,470	592	7,698	18,167	1,397
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)	1.57			10,067	15,805	592	930	16,735	10,659
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)	48.5			0	0	0	0	0	0
Rural Residential (RR)	82.7			0	0	0	0	0	0
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)				0		0			
Totals	348.51	0			107,914		128,676	236,590	

TABLE C-19

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC71

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)	30	461,345	15,378	4,027	120,804	592	17,764	599,913	19,997
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)		0		0		0			
Open Space (OS)	3	0	0	0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)		0		0		0			
Agriculture (AG)		0		0		0			
Totals	33	461,345			120,804		17,764	599,913	

TABLE C-20

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC72

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)	61.37			0	0	0	0	0	0
Totals	61.37	0			0		0	0	

TABLE C-21

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC73

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)	37.51			403	15,105	592	22,211	37,315	995
Rural Residential (RR)	13.97			805	11,251	592	8,272	19,523	1,397
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)	10.33			0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)	9.6			0	0	0	0	0	0
Rural Residential (RR)	18.9			0	0	0	0	0	0
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)				0		0			
Totals	90.31	0			26,355		30,483	56,838	

TABLE C-22

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC74

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)	70.24			403	28,284	592	41,591	69,875	995
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)	9.73			0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)				0		0			
Totals	79.97	0			28,284		41,591	69,875	

TABLE C-23

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC75

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)	24.81			403	9,991	592	14,691	24,681	995
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)				0		0			
Totals	24.81	0			9,991		14,691	24,681	

TABLE C-24

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC76

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)	7.5			0	0	0	0	0	0
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)	108.93			0	0	0	0	0	0
Totals	116.43	0			0		0	0	

TABLE C-25

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC80

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)	308.3	4,084,922	13,250	4,027	1,241,465	592	182,553	5,508,940	17,869
Medium Density Residential (MR)	128.02	1,922,409	15,016	7,047	902,146	592	75,804	2,900,359	22,656
High Density Residential (HR)	20.62	431,067	20,905	10,067	207,582	592	12,210	650,859	31,564
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)	13.02	322,024	24,733	10,067	131,073	592	7,710	460,806	35,392
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)	39.62	676,613	17,078	7,047	279,199	592	23,460	979,272	24,717
Recreation and Park (RP)	19.77	0	0	0	0	0	0	0	0
Open Space (OS)	15.28	0	0	0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)		0		0		0			
Agriculture (AG)		0		0		0			
Totals	544.63	7,437,034			2,761,464		301,737	10,500,235	

TABLE C-26

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC81

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)	254.82			403	102,611	592	150,886	253,497	995
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)				0		0			
Totals	254.82	0			102,611		150,886	253,497	

TABLE C-27

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC90

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)	99.05			0	0	0	0	0	0
Totals	99.05	0			0		0	0	

TABLE C-28

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC91

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)	93.56			0	0	0	0	0	0
Totals	93.56	0			0		0	0	

TABLE C-29

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC92

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)	0.63			0	0	0	0	0	0
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)	57.31			0	0	0	0	0	0
Totals	57.94	0			0		0	0	

TABLE C-30

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC100

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)	353.99			0	0	0	0	0	0
Totals	353.99	0			0		0	0	

TABLE C-31

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN MC110

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)	193.05			0	0	0	0	0	0
Totals	193.05	0			0		0	0	

TABLE C-32

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN NC10

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)	33.65	0	0	805	27,100	592	19,925	47,026	1,397
Low Density Residential (LR)	215.19	2,943,803	13,680	4,027	866,529	592	127,420	3,937,752	18,299
Medium Density Residential (MR)	58.83	912,102	15,504	7,047	414,570	592	34,835	1,361,506	23,143
High Density Residential (HR)	50.72	1,094,742	21,584	10,067	510,599	592	30,033	1,635,374	32,243
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)	7.27	185,647	25,536	10,067	73,187	592	4,305	263,139	36,195
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)	33.69	594,023	17,632	7,047	237,411	592	19,949	851,382	25,271
Recreation and Park (RP)	24.89	0	0	0	0	0	0	0	0
Open Space (OS)	20.22	0	0	0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)		0		0		0			
Agriculture (AG)		0		0		0			
Totals	444.46	5,730,317			2,129,396		236,467	8,096,180	

TABLE C-33

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN NC11

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)	44.3			805	35,678	592	26,231	61,909	1,397
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)				0		0			
Totals	44.3	0			35,678		26,231	61,909	

TABLE C-34

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN NC20

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)	58.77	861,254	14,655	4,027	236,655	592	34,799	1,132,709	19,274
Medium Density Residential (MR)	17.5	290,651	16,609	7,047	123,321	592	10,362	424,334	24,248
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)		0		0		0			
Open Space (OS)	3.2	0	0	0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)	7.72	0	0	0	0	0	0	0	0
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)		0		0		0			
Agriculture (AG)		0		0		0			
Totals	87.19	1,151,905			359,976		45,162	1,557,043	

TABLE C-35

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN NC21

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)	83.51			0	0	0	0	0	0
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)				0		0			
Totals	83.51	0			0		0	0	

TABLE C-36

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN NC22

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)	81.39			805	65,548	592	48,193	113,742	1,397
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)	14.4			0	0	0	0	0	0
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)				0		0			
Totals	95.79	0			65,548		48,193	113,742	

TABLE C-37

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN NC23

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)	65.28			805	52,574	592	38,654	91,228	1,397
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)	13.18			10,067	132,683	592	7,804	140,488	10,659
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)	2.50			0	0	0	0	0	0
Rural Residential (RR)	33.70			0	0	0	0	0	0
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)	16.53			0	0	0	0	0	0
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)				0		0			
Totals	131.19	0			185,257		46,458	231,716	

TABLE C-38

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN SC10

	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE	FEE	TOTAL FEE	FEE	TOTAL FEE	TOTAL FEE	FEE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)	337.79	4,134,949	12,241	4,027	1,360,215	592	200,015	5,695,179	16,860
Medium Density Residential (MR)	31.32	434,513	13,873	7,047	220,709	592	18,545	673,768	21,512
High Density Residential (HR)	24.16	466,623	19,314	10,067	243,219	592	14,306	724,148	29,973
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)	6.57	150,126	22,850	10,067	66,140	592	3,890	220,156	33,509
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)	7.63	120,382	15,778	7,047	53,768	592	4,518	178,668	23,417
Recreation and Park (RP)	9.56	0	0	0	0	0	0	0	0
Open Space (OS)	33.31	0	0	0	0	0	0	0	0
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)				0		0			
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)		0		0		0			
Agriculture (AG)		0		0		0			
Totals	450.34	5,306,593			1,944,052		241,275	7,491,920	

TABLE C-39

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

DRAINAGE FEES
SUBBASIN SC11

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		TOTAL FEE	FEE PER ACRE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)	44.47			403	17,907	592	26,332	44,239	995
Rural Residential (RR)	28.58			805	23,017	592	16,923	39,940	1,397
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)				10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)				0		0			
Open Space (OS)				0		0			
EXISTING DEVELOPMENT									
Rural Estates (RE)				0		0			
Rural Residential (RR)	34.00			0	0	0	0	0	0
Low Density Residential (LR)				0		0			
Medium Density Residential (MR)				0		0			
Commercial (NC, CC, and GC)				0		0			
Public/Quasi-Public (PQP)				0		0			
Recreation/Park/Open Space (RP & OS)				0		0			
Agriculture (AG)				0		0			
Totals	107.05	0			40,924		43,255	84,179	

TABLE C-40

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

PHASE 1 LAND USE

Land Use	Area (Acres)			
	Subbasin			Total
	MC10	MC20	MC71	
PROPOSED DEVELOPMENT[1]				
Rural Estates (RE)				0
Rural Residential (RR)				0
Low Density Residential (LR)	112		30	142
Medium Density Residential (MR)				0
High Density Residential (HR)				0
High Rise Residential (HRR)				0
Neighborhood Commercial (NC)				0
Community Comercial (CC)				0
Water Related Commercial (WRC)				0
General Commercial (GC)				0
Business Park (BP)		42		42
Mixed Use (MU)				0
Riverfront Mixed Use (RMU)				0
Light Industrial (LI)				0
Heavy Industrial (HI)				0
Water Related Industrial (WRI)		74		74
Public/Quasi-Public (PQP)				0
Recreation and Park (RP)	5	5.1		10
Open Space (OS)	5	48	3	56
EXISTING DEVELOPMENT[2]				
Rural Estates (RE)				0
Rural Residential (RR)	42			42
Low Density Residential (LR)	37	46		83
Medium Density Residential (MR)				0
Commercial (NC, CC, and GC)				0
Public/Quasi-Public (PQP)	2			2
Recreation/Park/Open Space (RP & OS)				0
Agriculture (AG)	673.5	252.8		926
Totals	876.5	467.9	33	1,377

[1]Proposed development is based upon the City of West Sacramento Southport Land Use Plan, 2000.

[2]Existing development is defined as development that exists in the 2000 Condition excluding the Southport Business Park Project and the Bridgeway Island Project.

TABLE C-41

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

PHASE 2 LAND USE

Land Use	Area (Acres)		
	Subbasin		Total
	MC10	MC80	
PROPOSED DEVELOPMENT[1]			
Rural Estates (RE)			0
Rural Residential (RR)			0
Low Density Residential (LR)	78	147	225
Medium Density Residential (MR)	134	74	208
High Density Residential (HR)	6	10	16
High Rise Residential (HRR)			0
Neighborhood Commercial (NC)			0
Community Comercial (CC)			0
Water Related Commercial (WRC)			0
General Commercial (GC)			0
Business Park (BP)			0
Mixed Use (MU)	18		18
Riverfront Mixed Use (RMU)			0
Light Industrial (LI)			0
Heavy Industrial (HI)			0
Water Related Industrial (WRI)			0
Public/Quasi-Public (PQP)	8	13	21
Recreation and Park (RP)	12	15	27
Open Space (OS)	12	17	29
EXISTING DEVELOPMENT[2]			
Rural Estates (RE)			0
Rural Residential (RR)	42		42
Low Density Residential (LR)	149		149
Medium Density Residential (MR)			0
Commercial (NC, CC, and GC)			0
Public/Quasi-Public (PQP)	2		2
Recreation/Park/Open Space (RP & OS)	10		10
Agriculture (AG)	405.5		406
Totals	876.5	276	1,153

[1]Proposed development is based upon the City of West Sacramento Southport Land Use Plan, 2000.

[2]Existing development for Phase 2 is defined as development that exists in the Phase 1 Condition.

TABLE C-42

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

PHASE 1 DRAINAGE FEES
SUBBASIN MC10

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)		0		805		592			
Low Density Residential (LR)	112	15,439	1,729,143	4,027	451,002	592	66,318	2,246,463	20,058
Medium Density Residential (MR)		17,497		7,047		592			
High Density Residential (HR)		24,359		10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)		28,819		10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)		21,957		10,067		592			
Riverfront Mixed Use (RMU)		21,957		10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)		27,447		10,067		592			
Public/Quasi-Public (PQP)		19,899		7,047		592			
Recreation and Park (RP)	5	0	0	0	0	0	0	0	0
Open Space (OS)	5	0	0	0	0	0	0	0	0
Totals	122		1,729,143		451,002		66,318	2,246,463	

TABLE C-43

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

PHASE 1 DRAINAGE FEES
SUBBASIN MC20

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)				4,027		592			
Medium Density Residential (MR)				7,047		592			
High Density Residential (HR)				10,067		592			
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)		19,080		10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)	42	19,080	801,370	10,067	422,815	592	24,869	1,249,055	29,739
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)		14,537		10,067		592			
Light Industrial (LI)		18,172		10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)	74	18,172	1,344,703	10,067	744,959	592	43,818	2,133,480	28,831
Public/Quasi-Public (PQP)				7,047		592			
Recreation and Park (RP)	5.1	0	0	0	0	0	0	0	0
Open Space (OS)	48	0	0	0	0	0	0	0	0
Totals	169.1		2,146,074		1,167,774		68,687	3,382,535	

TABLE C-44

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

PHASE 2 DRAINAGE FEES
SUBBASIN MC10

	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		FEE	TOTAL FEE	FEE	TOTAL FEE	FEE	TOTAL FEE	TOTAL FEE	FEE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)		0		805		592			
Low Density Residential (LR)	78	15,439	1,204,224	4,027	314,091	592	46,186	1,564,501	20,058
Medium Density Residential (MR)	134	17,497	2,344,635	7,047	944,286	592	79,345	3,368,267	25,136
High Density Residential (HR)	6	24,359	146,154	10,067	60,402	592	3,553	210,109	35,018
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)		28,819		10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)	18	21,957	395,233	10,067	181,206	592	10,658	587,097	32,617
Riverfront Mixed Use (RMU)		21,957		10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)		27,447		10,067		592			
Public/Quasi-Public (PQP)	8	19,899	159,191	7,047	56,375	592	4,737	220,303	27,538
Recreation and Park (RP)	12	0	0	0	0	0	0	0	0
Open Space (OS)	12	0	0	0	0	0	0	0	0
Totals	268		4,249,436		1,556,361		144,480	5,950,277	

TABLE C-45

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

PHASE 2 DRAINAGE FEES
SUBBASIN MC80

LAND USE	AREA	SUBBASIN SPECIFIC DRAINAGE FACILITIES		COMMON DRAINAGE FACILITIES		EXEMPT LAND COST		TOTAL	
		FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	FEE PER ACRE	TOTAL FEE	TOTAL FEE	FEE PER ACRE
	(ACRES)	($)	($)	($)	($)	($)	($)	($)	($)
PROPOSED DEVELOPMENT									
Rural Estates (RE)				403		592			
Rural Residential (RR)				805		592			
Low Density Residential (LR)	147	13,250	1,947,725	4,027	591,941	592	87,043	2,626,708	17,869
Medium Density Residential (MR)	74	15,016	1,111,219	7,047	521,472	592	43,818	1,676,508	22,656
High Density Residential (HR)	10	20,905	209,053	10,067	100,670	592	5,921	315,644	31,564
High Rise Residential (HRR)				0		592			
Neighborhood Commercial (NC)		24,733		10,067		592			
Community Comercial (CC)				10,067		592			
Water Related Commercial (WRC)				0		592			
General Commercial (GC)				10,067		592			
Business Park (BP)				10,067		592			
Mixed Use (MU)				10,067		592			
Riverfront Mixed Use (RMU)				10,067		592			
Light Industrial (LI)				10,067		592			
Heavy Industrial (HI)				0		592			
Water Related Industrial (WRI)				10,067		592			
Public/Quasi-Public (PQP)	13	17,078	222,008	7,047	91,610	592	7,698	321,316	24,717
Recreation and Park (RP)	15	0	0	0	0	0	0	0	0
Open Space (OS)	17	0	0	0	0	0	0	0	0
Totals	276		3,490,005		1,305,692		144,480	4,940,176	

Appendix D

STORM DRAINAGE PIPE AND OVERLAND CONVEYANCE SYSTEM DESIGN FLOW CALCULATIONS

TABLE D-1

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN MC10
SACRAMENTO METHOD DESIGN FLOW

From Node	To Node	Land Use																Total for Area Contributing at Node			Cummulative Total at Node			Sacramento Method Zone 2 [1]					
		LR		MR		Park/Open Space		HR		MU/RMU		P/QP		WRI		Road/RxR/NC		Area	Impervious Area	Average Impervious	Area	Impervious Area	Average Impervious	10-year Coefficients		100-year Coefficients		Peak Design Flow	
		30% Impervious		40% Impervious		5% Impervious		70% Impervious		60% Impervious		50% Impervious		85% Impervious		90% Impervious												10-yr Q	100-yr Q
		Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	(acres)	(acres)		(acres)	(acres)		k	n	k	n	(cfs)	(cfs)
A12	A11	15.60	4.68													32.30	29.07	47.9	33.8	70%	47.9	33.8	70%	1.9781	0.8166	3.0168	0.7984	47	66
A11	A10	8.40	2.52													16.70	15.03	25.1	17.6	70%	73.0	51.3	70%	1.9768	0.8165	3.0141	0.7984	66	93
A10	A9															11.40	10.26	11.4	10.3	90%	84.4	61.6	73%	1.9950	0.8173	3.0526	0.7983	75	105
A9	A8															35.30	31.77	35.3	31.8	90%	119.7	93.3	78%	2.0260	0.8183	3.1237	0.7979	102	142
A8	A7															24.80	22.32	24.8	22.3	90%	144.5	115.7	80%	2.0375	0.8186	3.1521	0.7976	119	166
A7	A6	6.20	1.86															6.2	1.9	30%	150.7	117.5	78%	2.0260	0.8183	3.1237	0.7979	123	171
A6	A5	18.90	5.67															18.9	5.7	30%	169.6	123.2	73%	1.9930	0.8172	3.0482	0.7983	132	184
A5	A4	11.40	3.42															11.4	3.4	30%	181.0	126.6	70%	1.9745	0.8164	3.0093	0.7984	138	191
A4	A3	6.60	1.98															6.6	2.0	30%	187.6	128.6	69%	1.9644	0.8160	2.9887	0.7983	141	195
A3	A2	33.00	9.90															33.0	9.9	30%	220.6	138.5	63%	1.9193	0.8138	2.9021	0.7978	155	215
A2	A1															3.30	2.97	3.3	3.0	90%	223.9	141.5	63%	1.9226	0.8140	2.9082	0.7978	157	218
A50	A1			32.10	12.84													32.1	12.8	40%	32.1	12.8	40%	1.6863	0.7997	2.5307	0.7898	27	39
A1	Outfall			13.10	5.24	1.00	0.05					1.70	0.85			9.60	8.64	25.4	14.8	58%	281.4	169.1	60%	1.8963	0.8126	2.8607	0.7973	185	257
B8	B7			16.20	6.48					20.00	12.00					7.20	6.48	43.4	25.0	58%	43.4	25.0	58%	1.8732	0.8113	2.8205	0.7968	40	57
B7	B6									9.40	5.64					6.40	5.76	15.8	11.4	72%	59.2	36.4	61%	1.9079	0.8132	2.8813	0.7976	53	75
B6	B5	6.30	1.89													5.00	4.50	11.3	6.4	57%	70.5	42.8	61%	1.9012	0.8129	2.8693	0.7974	60	85
B52	B51	34.70	10.41			2.20	0.11											36.9	10.5	29%	36.9	10.5	29%	1.5354	0.7891	2.3253	0.7822	26	39
B53	B51	33.00	9.90			1.80	0.09											34.8	10.0	29%	34.8	10.0	29%	1.5382	0.7893	2.3289	0.7824	25	37
B51	B50																	0.0	0.0	0%	71.7	20.5	29%	1.5367	0.7892	2.3271	0.7823	45	66
B50	B5	20.70	6.21															20.7	6.2	30%	92.4	26.7	29%	1.5411	0.7895	2.3328	0.7825	55	81
B54	B5	30.80	9.24															30.8	9.2	30%	30.8	9.2	30%	1.5562	0.7906	2.3526	0.7833	23	34
B5	B4															2.50	2.25	2.5	2.3	90%	196.2	81.0	41%	1.7015	0.8007	2.5525	0.7905	117	166
B4	B3	7.00	2.10			0.70	0.04					8.40	4.20			2.30	2.07	18.4	8.4	46%	214.6	89.4	42%	1.7060	0.8010	2.5590	0.7907	126	179
B3	B2	25.10	7.53	2.30	0.92											2.50	2.25	29.9	10.7	36%	244.5	100.1	41%	1.6974	0.8004	2.5467	0.7903	138	197
B2	B1			14.80	5.92											1.70	1.53	16.5	7.5	45%	261.0	107.5	41%	1.7006	0.8006	2.5513	0.7904	146	207
B1	Outfall							5.50	3.85							3.00	2.70	8.5	6.6	77%	269.5	114.1	42%	1.7141	0.8015	2.5708	0.7910	152	215
C53	C5							9.10	6.37	11.20	6.72					11.50	10.35	31.8	23.4	74%	31.8	23.4	74%	2.0000	0.8174	3.0637	0.7983	34	48
C52	C51			21.50	8.60	3.00	0.15	5.60	3.92							5.70	5.13	35.8	17.8	50%	35.8	17.8	50%	1.7964	0.8068	2.6950	0.7943	32	46
C51	C5							19.00	13.30							1.30	1.17	20.3	14.5	71%	56.1	32.3	58%	1.8733	0.8113	2.8207	0.7968	49	70
C6	C5					12.20	0.61			6.00	3.60			14.90	12.67	0.30	0.27	33.4	17.1	51%	33.4	17.1	51%	1.8132	0.8078	2.7214	0.7949	31	44
C5	C4	0.20	0.06	0.40	0.16					7.30	4.38					1.70	1.53	9.6	6.1	64%	130.9	79.0	60%	1.8986	0.8127	2.8647	0.7974	100	140
C42	C41			3.10	1.24	2.60	0.13	26.20	18.34									31.9	19.7	62%	31.9	19.7	62%	1.9110	0.8134	2.8870	0.7976	32	46
C41	C4			8.30	3.72													9.3	3.7	40%	41.2	23.4	57%	1.8673	0.8110	2.8104	0.7966	38	54
C4	C3	15.70	4.71	0.60	0.24							10.60	5.30					26.9	10.3	38%	199.0	112.7	57%	1.8649	0.8109	2.8063	0.7965	136	190
C3	C2	1.10	0.33	13.30	5.32													14.4	5.7	39%	213.4	118.3	55%	1.8538	0.8102	2.7877	0.7962	143	199
C2	C1			7.00	2.80													7.0	2.8	40%	220.4	121.1	55%	1.8491	0.8100	2.7799	0.7961	146	204
C1	Outfall			3.40	1.36													3.4	1.4	40%	223.8	122.5	55%	1.8469	0.8098	2.7762	0.7960	148	206
D7	D6			28.40	11.36	1.50	0.08											29.9	11.4	38%	29.9	11.4	38%	1.6646	0.7982	2.5001	0.7888	25	36
D6	D5	21.10	6.33			1.00	0.05											22.1	6.4	29%	52.0	17.8	34%	1.6137	0.7947	2.4296	0.7863	37	54
D5	D4	1.00	0.30	0.30	0.12													1.3	0.4	32%	53.3	18.2	34%	1.6131	0.7946	2.4287	0.7863	38	55
D4	D3			2.00	0.80													2.0	0.8	40%	55.3	19.0	34%	1.6158	0.7948	2.4325	0.7864	39	57
D3	D2			3.10	1.24	0.30	0.02											3.4	1.3	37%	58.7	20.3	35%	1.6177	0.7949	2.4350	0.7865	41	60
D2	D1					5.10	0.26	0.30	0.21							2.00	1.80	7.4	2.3	31%	66.1	22.6	34%	1.6119	0.7945	2.4271	0.7862	45	65
D1	Outfall			7.00	2.80	4.20	0.21											11.2	3.0	27%	77.3	25.6	33%	1.5980	0.7936	2.4083	0.7855	50	73
TOTALS		296.80	89.04	177.90	71.16	35.60	1.78	65.70	45.99	53.90	32.34	20.70	10.35	14.90	12.67	186.50	167.85	852.00	431.18	51%	852.00	431.18	51%						

[1] Sacramento Method Zone 2 peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-3

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN MC11
SACRAMENTO METHOD DESIGN FLOW

From Node	To Node	Land Use								Total for Area Contributing at Node			Cummulative Total at Node			Sacramento Method Zone 2 [1]					
		Park/Open Space 5% Impervious		MU/RMU 60% Impervious		P/QP 50% Impervious		Road/RxR/NC/CC 90% Impervious		Area	Impervious Area	Average Impervious	Area	Impervious Area	Average Impervious	10-year Coefficients		100-year Coefficients		Peak Design Flow	
		Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	(acres)	(acres)		(acres)	(acres)		k	n	k	n	10-yr Q (cfs)	100-yr Q (cfs)
A6	A5			6.40	3.84					6.4	3.8	60%	6.4	3.8	60%	1.8956	0.8126	2.8594	0.7973	9	13
A5	A4			10.80	6.48					10.8	6.5	60%	17.2	10.3	60%	1.8956	0.8126	2.8594	0.7973	19	28
A4	A3			3.60	2.16			5.20	4.68	8.8	6.8	78%	26.0	17.2	66%	1.9452	0.8151	2.9509	0.7982	28	40
A3	A2	1.00	0.05	7.70	4.62					8.7	4.7	54%	34.7	21.8	63%	1.9204	0.8139	2.9042	0.7978	34	49
A2	Outfall			18.20	10.92			3.70	3.33	21.9	14.3	65%	56.6	36.1	64%	1.9273	0.8142	2.9169	0.7979	52	73
B5	B4					3.40	1.70	18.30	16.47	21.7	18.2	84%	21.7	18.2	84%	2.0563	0.8189	3.2022	0.7969	26	37
B4	B3							12.40	11.16	12.4	11.2	90%	34.1	29.3	86%	2.0667	0.8190	3.2324	0.7963	37	54
B3	B2							3.90	3.51	3.9	3.5	90%	38.0	32.8	86%	2.0685	0.8191	3.2377	0.7962	41	59
B2	Outfall			7.10	4.26					7.1	4.3	60%	45.1	37.1	82%	2.0491	0.8188	3.1824	0.7972	46	66
TOTALS		1.00	0.05	53.80	32.28	3.40	1.70	43.50	39.15	101.70	73.18	72%	101.70	73.18	72%						

[1] Sacramento Method Zone 2 peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-4

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN MC11
NOLTE METHOD DESIGN FLOW

From Node	To Node	Land Use								Total for Area Contributing at Node						Cummulative Total at Node									
		Nolte Formula Classification, R	Nolte Formula Classification, M						Nolte Formula Classification, C																
		AG, RR, RE, LR, MR, RP, O.S.	P/QP I= 60		HR I= 80		HRR I= 90		CC, NC, WRI, LI, HI, HSC,WRC,GC, O, BP, MU, RMU, MCI																
		Area (acres)	Area (acres)	Area *	Area (acres)	Area * I	Area (acres)	Area *	Area (acres)	Total Area (acres)	Nolte Formula Classification R Area (acres)	Nolte Formula Classification M Area (acres)	Nolte Formula Classification M Area * I	Nolte Formula Classification C Area (acres)	Total Cumulative Area (acres)	Nolte Formula Classification R Area (acres)	Nolte Formula Classification M Area (acres)	Nolte Formula Classification M Area * I	Nolte Formula Classification C Area (acres)	Nolte Formula Classification M Avgerage I	Qr (cfs)	Qc (cfs)	Qm (cfs)	Nolte Zone 3 Qdesign[1] (cfs)
A6	A5								6.4	6.4				6.4	6.4				6.4		1.23	3.12		3.1
A5	A4								10.8	10.8				10.8	17.2				17.2		3.23	8.54		8.5
A4	A3								8.8	8.8				8.8	26.0				26.0		5.06	12.96		13.0
A3	A2	1.00							7.7	8.7	1.0			7.7	34.7	1.0			33.7		7.02	17.32		17.0
A2	Outfall								21.9	21.9				21.9	56.6	1.0			55.6		13.13	27.81		27.6
B5	B4		3.4	204					18.3	21.7		3.4	204	18.3	21.7		3.4	204.0	18.3	60	4.14	10.80	5.8	10.0
B4	B3								12.4	12.4				12.4	34.1		3.4	204.0	30.7	60	6.88	17.02	9.4	16.3
B3	B2								3.9	3.9				3.9	38.0		3.4	204.0	34.6	60	7.82	18.98	10.6	18.2
B2	Outfall								7.1	7.1				7.1	45.1		3.4	204.0	41.7	60	9.60	22.54	12.8	21.8
TOTALS		1.0	3.4						97.3	101.7	1.0	3.4	204.0	97.3	101.7	1.0	3.4	204.0	97.3	60				

[1] Nolte peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-5

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN MC20
SACRAMENTO METHOD DESIGN FLOW

From Node	To Node	Land Use										Total for Area Contributing at Node			Cummulative Total at Node			Sacramento Method Zone 2 [1]					
		LR		Park/Open Space		LI/WRI		RMU		Road/RxR/NC/BP		Area	Impervious Area	Average Impervious	Area	Impervious Area	Average Impervious	10-year Coefficients		100-year Coefficients		Peak Design Flow	
		30% Impervious		5% Impervious		85% Impervious		60% Impervious		90% Impervious												10-yr Q	100-yr Q
		Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	(acres)	(acres)		(acres)	(acres)		k	n	k	n	(cfs)	(cfs)
A4	A3					39.30	33.41					39.3	33.4	85%	39.3	33.4	85%	2.0622	0.8190	3.2190	0.7966	42	60
A31	A3					14.50	12.33					14.5	12.3	85%	14.5	12.3	85%	2.0622	0.8190	3.2190	0.7966	18	27
A3	A2					17.20	14.62					17.2	14.6	85%	71.0	60.4	85%	2.0622	0.8190	3.2190	0.7966	68	96
A2	Outfall					23.70	20.15					23.7	20.1	85%	94.7	80.5	85%	2.0622	0.8190	3.2190	0.7966	86	121
B4	B3									31.70	28.53	31.7	28.5	90%	31.7	28.5	90%	2.0828	0.8190	3.2841	0.7951	35	51
B3	B2					4.30	3.66			31.30	28.17	35.6	31.8	89%	67.3	60.4	90%	2.0816	0.8190	3.2800	0.7952	65	93
B2	Outfall			35.20	1.76							35.2	1.8	5%	102.5	62.1	61%	1.9008	0.8129	2.8687	0.7974	82	115
C6	C5	46.00	13.80					10.00	6.00			56.0	19.8	35%	56.0	19.8	35%	1.6280	0.7957	2.4491	0.7870	40	58
C5	C4									29.80	26.82	29.8	26.8	90%	85.8	46.6	54%	1.8432	0.8096	2.7700	0.7959	68	96
C4	C3			4.20	0.21					9.80	8.82	14.0	9.0	65%	99.8	55.7	56%	1.8569	0.8104	2.7928	0.7963	77	109
C31	C3									24.20	21.78	24.2	21.8	90%	24.2	21.8	90%	2.0828	0.8190	3.2841	0.7951	28	41
C3	C2									8.40	7.56	8.4	7.6	90%	132.4	85.0	64%	1.9309	0.8144	2.9237	0.7980	103	144
C2	Outfall									1.90	1.71	1.9	1.7	90%	134.3	86.7	65%	1.9338	0.8146	2.9292	0.7980	105	146
D4	D3					15.60	13.26					15.6	13.3	85%	15.6	13.3	85%	2.0622	0.8190	3.2190	0.7966	20	29
D3	D2					26.90	22.87					26.9	22.9	85%	42.5	36.1	85%	2.0622	0.8190	3.2190	0.7966	44	64
D2	Outfall					17.20	14.62					17.2	14.6	85%	59.7	50.7	85%	2.0622	0.8190	3.2190	0.7966	59	84
E	Outfall					13.70	11.65					13.7	11.6	85%	13.7	11.6	85%	2.0622	0.8190	3.2190	0.7966	18	26
F	Outfall					14.50	12.33					14.5	12.3	85%	14.5	12.3	85%	2.0622	0.8190	3.2190	0.7966	18	27
TOTALS		46.00	13.80	39.40	1.97	186.90	158.87	10.00	6.00	137.10	123.39	419.40	304.03	72%	419.40	304.03	72%						

[1] Sacramento Method Zone 2 peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-6

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN MC20
NOLTE METHOD DESIGN FLOW

From Node	To Node	Land Use								Total for Area Contributing at Node						Cumulative Total at Node									
		Nolte Formula Classification, R	Nolte Formula Classification, M						Nolte Formula Classification, C																
		AG, RR, RE, LR, MR, RP, O.S.	P/QP I= 60		HR I= 80		HRR I= 90		CC, NC, WRI, LI, HI, HSC,WRC,GC, O, BP, MU, RMU, MCI	Total	Nolte Formula Classification R	Nolte Formula Classification M	Nolte Formula Classification M	Nolte Formula Classification C		Total Cumulative	Nolte Formula Classification R	Nolte Formula Classification M	Nolte Formula Classification M	Nolte Formula Classification C	Nolte Formula Classification M				
		Area (acres)	Area (acres)	Area *	Area (acres)	Area * I	Area (acres)	Area *	Area (acres)	Area (acres)	Area (acres)	Area (acres)	Area * I	Area (acres)		Area (acres)	Area (acres)	Area (acres)	Area * I	Area (acres)	Avgerage I	Qr (cfs)	Qe (cfs)	Qm (cfs)	Nolte Zone 3 Qdesign[1] (cfs)
A4	A3								39.3	39.3				39.3		39.3				39.3		8.13	19.63		19.6
A31	A3								14.5	14.5				14.5		14.5				14.5		2.71	7.19		7.2
A3	A2								17.2	17.2				17.2		71.0				71.0		17.57	33.70		33.7
A2	Outfall								23.7	23.7				23.7		94.7				94.7		26.86	43.84		43.8
B4	B3								31.7	31.7				31.7		31.7				31.7		6.33	15.82		15.8
B3	B2								35.6	35.6				35.6		67.3				67.3		16.34	32.17		32.2
B2	Outfall	35.2								35.2	35.2					102.5	35.2			67.3		30.46	47.30		41.5
C6	C5	46.0							10.0	56.0	46.0			10.0		56.0	46.0			10.0		12.96	27.57		15.6
C5	C4								29.8	29.8				29.8		85.8	46.0			39.8		23.08	39.97		30.9
C4	C3	4.2							9.8	14.0	4.2			9.8		99.8	50.2			49.6		29.18	46.10		37.6
C31	C3								24.2	24.2				24.2		24.2				24.2		4.67	12.05		12.1
C3	C2								8.4	8.4				8.4		132.4	50.2			82.2		46.74	61.13		55.7
C2	Outfall								1.9	1.9				1.9		134.3	50.2			84.1		47.90	62.04		56.8
D4	D3								15.6	15.6				15.6		15.6				15.6		2.92	7.74		7.7
D3	D2								26.9	26.9				26.9		42.5				42.5		8.93	21.24		21.2
D2	Outfall								17.2	17.2				17.2		59.7				59.7		14.01	29.06		29.1
E	Outfall								13.7	13.7				13.7		13.7				13.7		2.56	6.78		6.8
F	Outfall								14.5	14.5				14.5		14.5				14.5		2.71	7.19		7.2
TOTALS		85.4							334.0	419.4	85.4			334.0		419.4	85.4			334.0					

[1] Nolte peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-7

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN MC71
SACRAMENTO METHOD DESIGN FLOW

From Node	To Node	Land Use		Total for Area Contributing at Node			Cummulative Total at Node			Sacramento Method Zone 2 [1]					
		LR 30% Impervious		Area	Impervious Area	Average Impervious	Area	Impervious Area	Average Impervious	10-year Coefficients		100-year Coefficients		Peak Design Flow	
		Area (acres)	Imp. Area (acres)	(acres)	(acres)		(acres)	(acres)		k	n	k	n	10-yr Q (cfs)	100-yr Q (cfs)
B11	B1	3.30	0.99	3.3	1.0	30%	3.3	1.0	30%	1.5562	0.7906	2.3526	0.7833	4	6
B3	B2	2.40	0.72	2.4	0.7	30%	2.4	0.7	30%	1.5562	0.7906	2.3526	0.7833	3	5
B2	B1	2.40	0.72	2.4	0.7	30%	4.8	1.4	30%	1.5562	0.7906	2.3526	0.7833	5	8
B1	X	3.10	0.93	3.1	0.9	30%	11.2	3.4	30%	1.5562	0.7906	2.3526	0.7833	11	16
A12	A11	4.00	1.20	4.0	1.2	30%	4.0	1.2	30%	1.5562	0.7906	2.3526	0.7833	5	7
A11	A1	2.50	0.75	2.5	0.8	30%	6.5	2.0	30%	1.5562	0.7906	2.3526	0.7833	7	10
A4	A3	1.60	0.48	1.6	0.5	30%	1.6	0.5	30%	1.5562	0.7906	2.3526	0.7833	2	3
A3	A2	1.00	0.30	1.0	0.3	30%	2.6	0.8	30%	1.5562	0.7906	2.3526	0.7833	3	5
A2	A1	1.20	0.36	1.2	0.4	30%	3.8	1.1	30%	1.5562	0.7906	2.3526	0.7833	4	7
A1	X	2.40	0.72	2.4	0.7	30%	12.7	3.8	30%	1.5562	0.7906	2.3526	0.7833	12	17
X	Outfall	1.00	0.30	1.0	0.3	30%	24.9	7.5	30%	1.5562	0.7906	2.3526	0.7833	20	29
TOTALS		24.90	7.47	24.90	7.47	30%	24.90	7.47							

[1] Sacramento Method Zone 2 peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-8

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN MC71
NOLTE METHOD DESIGN FLOW

From Node	To Node	Land Use								Total for Area Contributing at Node					Cummulative Total at Node									
		Nolte Formula Classification, R	Nolte Formula Classification, M						Nolte Formula Classification, C															
		AG, RR, RE, LR, MR, RP, O.S.	P/QP I= 60		HR I= 80		HRR I= 90		CC, NC, WRI, LI, HI, HSC,WRC,GC, O, BP, MU, RMU, MCI	Total Area	Nolte Formula Classification R Area	Nolte Formula Classification M Area	Nolte Formula Classification M Area * I	Nolte Formula Classification C Area	Total Cumulative Area	Nolte Formula Classification R Area	Nolte Formula Classification M Area	Nolte Formula Classification M Area * I	Nolte Formula Classification C Area	Nolte Formula Classification M Avgerage I	Qr	Qc	Qm	Nolte Zone 3 Qdesign[1]
		Area (acres)	Area (acres)	Area *	Area (acres)	Area * I	Area (acres)	Area *	Area (acres)	(acres)	(acres)	(acres)		(acres)	(acres)	(acres)	(acres)		(acres)		(cfs)	(cfs)	(cfs)	(cfs)
B11	B1	3.30								3.3	3.3				3.3	3.3					0.70	1.57		0.7
B3	B2	2.40								2.4	2.4				2.4	2.4					0.55	1.11		0.6
B2	B1	2.40								2.4	2.4				4.8	4.8					0.95	2.32		1.0
B1	X	3.10								3.1	3.1				11.2	11.2					2.09	5.53		2.1
A12	A11	4.00								4.0	4.0				4.0	4.0					0.82	1.92		0.8
A11	A1	2.50								2.5	2.5				6.5	6.5					1.25	3.17		1.2
A4	A3	1.60								1.6	1.6				1.6	1.6					0.42	0.71		0.4
A3	A2	1.00								1.0	1.0				2.6	2.6					0.58	1.21		0.6
A2	A1	1.20								1.2	1.2				3.8	3.8					0.78	1.82		0.8
A1	X	2.40								2.4	2.4				12.7	12.7					2.37	6.28		2.4
X	Outfall	1.00								1.0	1.0				24.9	24.9					4.82	12.40		4.8
TOTALS		24.9								24.9	24.9													

[1] Nolte peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-9

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN MC80
SACRAMENTO METHOD DESIGN FLOW

From Node	To Node	Land Use												Total for Area Contributing at Node			Cummulative Total at Node			Sacramento Method Zone 2 [1]					
		LR 30% Impervious		MR 40% Impervious		Park/Open Space 5% Impervious		HR 70% Impervious		P/QP 50% Impervious		Road/RxR/NC 90% Impervious		Area	Impervious Area	Average Impervious	Area	Impervious Area	Average Impervious	10-year Coefficients		100-year Coefficients		Peak Design Flow	
		Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	(acres)	(acres)		(acres)	(acres)		k	n	k	n	10-yr Q (cfs)	100-yr Q (cfs)
A212	A211	33.00	9.90											33.0	9.9	30%	33.0	9.9	30%	1.5562	0.7906	2.3526	0.7833	25	36
A211	A21			14.4	5.76									14.4	5.8	40%	47.4	15.7	33%	1.5975	0.7935	2.4077	0.7855	34	50
A200	A2	17.20	5.16											17.2	5.2	30%	17.2	5.2	30%	1.5562	0.7906	2.3526	0.7833	15	22
A26	A25									22.80	11.40			22.8	11.4	50%	22.8	11.4	50%	1.7994	0.8070	2.6996	0.7945	22	32
A25	A24	30.00	9.00			3.50	0.18							33.5	9.2	27%	56.3	20.6	37%	1.6432	0.7967	2.4702	0.7878	41	59
A24	A23			21.1	8.44									21.1	8.4	40%	77.4	29.0	37%	1.6552	0.7975	2.4868	0.7883	53	77
A23	A22					3.50	0.18	20.50	14.35	5.70	2.85	12.90	11.61	42.6	29.0	68%	120.0	58.0	48%	1.7817	0.8059	2.6721	0.7938	84	119
A22	A21			13.2	5.28									13.2	5.3	40%	133.2	63.3	48%	1.7728	0.8053	2.6583	0.7935	91	129
A21	A2	5.50	1.65	13.4	5.36									18.9	7.0	37%	199.5	86.0	43%	1.7229	0.8021	2.5837	0.7914	121	171
A2	Outfall	18.00	5.40	12.3	4.92									30.3	10.3	34%	247.0	101.4	41%	1.6991	0.8005	2.5491	0.7904	140	198
A7	A6	17.60	5.28			7.10	0.36							24.7	5.6	23%	24.7	5.6	23%	1.4523	0.7830	2.2190	0.7776	18	27
A6	A5	25.80	7.74			2.10	0.11							27.9	7.8	28%	52.6	13.5	26%	1.4941	0.7861	2.2719	0.7799	34	50
A5	A4	20.50	6.15	22.0	8.80	1.60	0.08			9.20	4.60			53.3	19.6	37%	105.9	33.1	31%	1.5736	0.7918	2.3756	0.7842	63	92
A4	A3	33.50	10.05	21.2	8.48									54.7	18.5	34%	160.6	51.6	32%	1.5857	0.7927	2.3917	0.7849	89	129
A3	Outfall	34.00	10.20	9.6	3.84									43.6	14.0	32%	204.2	65.7	32%	1.5858	0.7927	2.3919	0.7849	108	156
B3	B2	21.00	6.30											21.0	6.3	30%	21.0	6.3	30%	1.5562	0.7906	2.3526	0.7833	17	26
B2	Outfall	14.00	4.20											14.0	4.2	30%	35.0	10.5	30%	1.5562	0.7906	2.3526	0.7833	26	38
C2	Outfall	43.10	12.93			4.70	0.24							47.8	13.2	28%	47.8	13.2	28%	1.5217	0.7881	2.3074	0.7815	32	47
TOTALS		313.20	93.96	127.20	50.88	22.50	1.13	20.50	14.35	37.70	18.85	12.90	11.61	534.00	190.78	36%	534.00	190.78	36%						

[1] Sacramento Method Zone 2 peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-10

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN MC80
NOLTE METHOD DESIGN FLOW

From Node	To Node	Land Use								Total for Area Contributing at Node					Cummulative Total at Node								
		Nolte Formula Classification, R	Nolte Formula Classification, M						Nolte Formula Classification, C														
		AG, RR, RE, LR, MR, RP, O.S.	P/QP I= 60		HR I= 80		HRR I= 90		CC, NC, WRI, LI, HI, HSC,WRC,GC, O, BP, MU, RMU, MCI	Total Area	Nolte Formula Classification R Area	Nolte Formula Classification M Area	Nolte Formula Classification M Area * I	Nolte Formula Classification C Area	Total Cumulative Area	Nolte Formula Classification R Area	Nolte Formula Classification M Area	Nolte Formula Classification M Area * I	Nolte Formula Classification C Area	Nolte Formula Classification M Avgerage I	Qr	Qc	Qm	Nolte Zone 3 Qdesign[1]
		Area (acres)	Area (acres)	Area *	Area (acres)	Area * I	Area (acres)	Area *	Area (acres)	(acres)	(acres)	(acres)		(acres)	(acres)	(acres)	(acres)		(acres)		(cfs)	(cfs)	(cfs)	(cfs)
A212	A211	33.5								33.5	33.5				33.5	33.5					6.74	16.72		6.7
A211	A21	13.9								13.9	13.9				47.4	47.4					10.20	23.69		10.2
A200	A2	17.2								17.2	17.2				17.2	17.2					3.23	8.54		3.2
A26	A25		22.8	1,368						22.8		22.8	1368		22.8		22.8	1368.0		60	4.37	11.35	6.1	6.1
A25	A24	33.5								33.5	33.5				56.3	33.5	22.8	1368.0		60	13.04	27.69	16.7	14.5
A24	A23	21.1								21.1	21.1				77.4	54.6	22.8	1368.0		60	19.83	36.38	24.0	21.1
A23	A22	3.5	5.7	342	20.5	1,640			12.9	42.6	3.5	26.2	1982	12.9	120.0	58.1	49.0	3350.0	12.9	68	39.51	55.29	46.8	44.2
A22	A21	13.2								13.2	13.2				133.2	71.3	49.0	3350.0	12.9	68	47.23	61.52	53.8	51.0
A21	A2	19.5								19.5	19.5				200.1	138.2	49.0	3350.0	12.9	68	86.99	98.44	92.2	89.0
A2	Outfall	30.9								30.9	30.9				248.2	186.3	49.0	3350.0	12.9	68	108.83	123.09	115.4	110.9
A7	A6	24.7								24.7	24.7				24.7	24.7					4.78	12.30		4.8
A6	A5	27.9								27.9	27.9				52.6	52.6					12.06	26.21		12.1
A5	A4	44.1	9.2	552						53.3	44.1	9.2	552		105.9	96.7	9.2	552.0		60	32.11	48.83	36.3	32.5
A4	A3	54.7								54.7	54.7				160.6	151.4	9.2	552.0		60	68.74	77.89	71.0	68.9
A3	Outfall	43.6								43.6	43.6				204.2	195.0	9.2	552.0		60	88.87	100.56	91.8	89.0
B3	B2	21.0								21.0	21.0				21.0	21.0					4.00	10.45		4.0
B2	Outfall	14.0								14.0	14.0				35.0	35.0					7.10	17.47		7.1
C2	Outfall	47.8								47.8	47.8				47.8	47.8					10.30	23.90		10.3
TOTALS		464.1	37.7		20.5				12.9	535.2	464.1	58.2	3,902.0	12.9	535.2	464.1	58.2	3902.0	12.9					

[1] Nolte peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-11

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN NC10
SACRAMENTO METHOD DESIGN FLOW

From Node	To Node	Land Use														Total for Area Contributing at Node			Cummulative Total at Node			Sacramento Method Zone 2 [1]					
		LR		MR		Park/Open Space		HR		RR		P/QP		Road/RxR/NC		Area	Impervious Area	Average Imperviousness	Area	Impervious Area	Average Imperviousness	10-year Coefficients		100-year Coefficients		Peak Design Flow	
		30% Impervious Area (acres)	Imp. Area (acres)	40% Impervious Area (acres)	Imp. Area (acres)	5% Impervious Area (acres)	Imp. Area (acres)	70% Impervious Area (acres)	Imp. Area (acres)	15% Impervious Area (acres)	Imp. Area (acres)	50% Impervious Area (acres)	Imp. Area (acres)	90% Impervious Area (acres)	Imp. Area (acres)	(acres)	(acres)		(acres)	(acres)		k	n	k	n	10-yr Q (cfs)	100-yr Q (cfs)
A4	A3	5.20	1.56	35.00	14.00											40.2	15.6	39%	40.2	15.6	39%	1.6704	0.7986	2.5081	0.7891	32	46
A3	A2							9.00	6.30							9.0	6.3	70%	49.2	21.9	44%	1.7385	0.8031	2.6066	0.7921	40	57
A21	A2	32.00	9.60	22.00	8.80	5.50	0.28									59.5	18.7	31%	59.5	18.7	31%	1.5753	0.7920	2.3778	0.7843	40	59
A2	Outfall	56.00	16.80			4.00	0.20									60.0	17.0	28%	168.7	57.5	34%	1.6116	0.7945	2.4268	0.7862	95	137
B7	B6	6.00	1.80							30.50	4.58					36.5	6.4	17%	36.5	6.4	17%	1.3694	0.7768	2.1165	0.7727	22	34
B6	B5	13.90	4.17			28.00	1.40	8.60	6.02					4.00	3.60	54.5	15.2	28%	91.0	21.6	24%	1.4656	0.7840	2.2357	0.7783	50	75
B5	B4	5.40	1.62			5.00	0.25	7.50	5.25			11.60	5.80	3.00	2.70	32.5	15.6	48%	123.5	37.2	30%	1.5577	0.7907	2.3546	0.7834	70	102
B41	B4	14.80	4.44			2.50	0.13	4.10	2.87			8.20	4.10			29.6	11.5	39%	29.6	11.5	39%	1.6736	0.7988	2.5127	0.7892	25	36
B4	B3					3.50	0.18	13.00	9.10							16.5	9.3	56%	169.6	58.0	34%	1.6128	0.7946	2.4284	0.7863	95	137
B3	B2							7.80	5.46			15.00	7.50			22.8	13.0	57%	192.4	71.0	37%	1.6475	0.7970	2.4761	0.7880	109	156
B2	Outfall	13.30	3.99													13.3	4.0	30%	205.7	74.9	36%	1.6418	0.7966	2.4682	0.7877	114	164
C4	C3	27.00	8.10													27.0	8.1	30%	27.0	8.1	30%	1.5562	0.7906	2.3526	0.7833	21	31
C3	C2	26.00	7.80													26.0	7.8	30%	53.0	15.9	30%	1.5562	0.7906	2.3526	0.7833	36	53
C2	Outfall	14.40	4.32													14.4	4.3	30%	67.4	20.2	30%	1.5562	0.7906	2.3526	0.7833	43	64
TOTALS		214.00	64.20	57.00	22.80	48.50	2.43	50.00	35.00	30.50	4.58	34.80	17.40	7.00	6.30	441.80	152.70	35%	441.80	152.70	35%						

[1] Sacramento Method Zone 2 peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-12

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN NC10
NOLTE METHOD DESIGN FLOW

From Node	To Node	Land Use								Total for Area Contributing at Node					Cummulative Total at Node								
		Nolte Formula Classification, R	Nolte Formula Classification, M						Nolte Formula Classification, C														
		AG, RR, RE, LR, MR, RP, O.S.	P/QP I= 60		HR I= 80		HRR I= 90		CC, NC, WRI, LI, HI, HSC,WRC,GC, O, BP, MU, RMU, MCI	Total	Nolte Formula Classification R	Nolte Formula Classification M	Nolte Formula Classification M	Nolte Formula Classification C	Total Cumulative	Nolte Formula Classification R	Nolte Formula Classification M	Nolte Formula Classification M	Nolte Formula Classification C	Nolte Formula Classification M	Qr	Qc	Qm	Nolte Zone 3 Qdesign[1]
		Area (acres)	Area (acres)	Area *	Area (acres)	Area * I	Area (acres)	Area *	Area (acres)	Area (acres)	Area (acres)	Area (acres)	Area * I	Area (acres)	Area (acres)	Area (acres)	Area (acres)	Area * I	Area (acres)	Avgerage I	(cfs)	(cfs)	(cfs)	(cfs)
A4	A3	40.20								40.2	40.2				40.2	40.2					8.36	20.08		8.4
A3	A2				9.0	720				9.0		9.0	720		49.2	40.2	9.0	720.0		80	10.68	24.60	21.1	12.6
A21	A2	59.50								59.5	59.5				59.5	59.5					13.95	28.98		13.9
A2	Outfall	60.00								60.0	60.0				168.7	159.7	9.0	720.0		80	72.51	82.12	79.7	72.9
B7	B6	36.50								36.5	36.5				36.5	36.5					7.45	18.22		7.5
B6	B5	41.90			8.6	688			4.0	54.5	41.9	8.6	688	4.0	91.0	78.4	8.6	688.0	4.0	80	25.25	42.22	38.0	27.2
B5	B4	10.40	11.6	696	7.5	600			3.0	32.5	10.4	19.1	1296	3.0	123.5	88.8	27.7	1984.0	7.0	72	41.48	56.92	49.8	44.2
B41	B4	17.30	8.2	492	4.1	328				29.6	17.3	12.3	820		29.6	17.3	12.3	820.0		67	5.85	14.76	9.6	7.4
B4	B3	3.50			13.0	1,040				16.5	3.5	13.0	1040		169.6	109.6	53.0	3844.0	7.0	73	72.92	82.59	78.4	75.0
B3	B2		15.0	900	7.8	624				22.8		22.8	1524		192.4	109.6	75.8	5368.0	7.0	71	83.45	94.45	89.2	86.1
B2	Outfall	13.30								13.3	13.3				205.7	122.9	75.8	5368.0	7.0	71	89.55	101.33	95.7	92.2
C4	C3	27.00								27.0	27.0				27.0	27.0					5.27	13.46		5.3
C3	C2	26.00								26.0	26.0				53.0	53.0					12.16	26.37		12.2
C2	Outfall	14.40								14.4	14.4				67.4	67.4					16.37	32.21		16.4
TOTALS		350.0	34.8		50.0				7.0	441.8	350.0	84.8	6,088.0	7.0	441.8	350.0	84.8	6088.0	7.0					

[1] Nolte peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-13

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN NC20
SACRAMENTO METHOD DESIGN FLOW

From Node	To Node	Land Use						Total for Area Contributing at Node			Cummulative Total at Node			Sacramento Method Zone 2 [1]					
		RR		LR		MR		Area	Impervious Area	Average Impervious	Area	Impervious Area	Average Impervious	10-year Coefficients		100-year Coefficients		Peak Design Flow	
		15% Impervious		30% Impervious		40% Impervious												10-yr Q	100-yr Q
		Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	Area (acres)	Imp. Area (acres)	(acres)	(acres)		(acres)	(acres)		k	n	k	n	(cfs)	(cfs)
A4	A3					16.20	6.48	16.2	6.5	40%	16.2	6.5	40%	1.6863	0.7997	2.5307	0.7898	16	23
A3	A2			30.30	9.09			30.3	9.1	30%	46.5	15.6	33%	1.6034	0.7940	2.4157	0.7858	34	49
A2	Outfall	7.70	1.16					7.7	1.2	15%	54.2	16.7	31%	1.5680	0.7914	2.3682	0.7839	37	54
B2	Outfall			28.00	8.40			28.0	8.4	30%	28.0	8.4	30%	1.5562	0.7906	2.3526	0.7833	22	32
TOTALS		7.70	1.16	58.30	17.49	16.20	6.48	82.20	25.13	31%	82.20	25.13	31%						

[1] Sacramento Method Zone 2 peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-14

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN NC20
NOLTE METHOD DESIGN FLOW

From Node	To Node	Land Use								Total for Area Contributing at Node					Cummulative Total at Node									
		Nolte Formula Classification, R	Nolte Formula Classification, M						Nolte Formula Classification, C															
		AG, RR, RE, LR, MR, RP, O.S.	P/QP I= 60		HR I= 80		HRR I= 90		CC, NC, WRI, LI, HI, HSC,WRC,GC, O, BP, MU, RMU, MCI	Total Area (acres)	Nolte Formula Classification R Area (acres)	Nolte Formula Classification M Area (acres)	Nolte Formula Classification M Area * I	Nolte Formula Classification C Area (acres)	Total Cumulative Area (acres)	Nolte Formula Classification R Area (acres)	Nolte Formula Classification M Area (acres)	Nolte Formula Classification M Area * I	Nolte Formula Classification C Area (acres)	Nolte Formula Classification M Avgerage I	Qr (cfs)	Qc (cfs)	Qm (cfs)	Nolte Zone 3 Qdesign[1] (cfs)
		Area (acres)	Area (acres)	Area *	Area (acres)	Area * I	Area (acres)	Area *	Area (acres)															
A4	A3	16.20								16.2	16.2				16.2	16.2					3.04	8.04		3.0
A3	A2	30.30								30.3	30.3				46.5	46.5					9.96	23.24		10.0
A2	Outfall	7.70								7.7	7.7				54.2	54.2					12.48	26.85		12.5
B2	Outfall	28.00								28.0	28.0				28.0	28.0					5.49	13.96		5.5
TOTALS		82.2								82.2	82.2				82.2	82.2								

[1] Nolte peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-15

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN SC10
SACRAMENTO METHOD DESIGN FLOW

From Node	To Node	Land Use												Total for Area Contributing at Node			Cummulative Total at Node			Sacramento Method Zone 2 [1]					
		LR		MR		Park/Open Space		HR		P/QP		Road/RxR/NC								10-year Coefficients		100-year Coefficients		Peak Design Flow	
		30% Area (acres)	Impervious Imp. Area (acres)	40% Area (acres)	Impervious Imp. Area (acres)	5% Area (acres)	Impervious Imp. Area (acres)	70% Area (acres)	Impervious Imp. Area (acres)	50% Area (acres)	Impervious Imp. Area (acres)	90% Area (acres)	Impervious Imp. Area (acres)	Area (acres)	Impervious Area (acres)	Average Impervious	Area (acres)	Impervious Area (acres)	Average Impervious	k	n	k	n	10-yr Q (cfs)	100-yr Q (cfs)
A3	A2	27.00	8.10			5.00	0.25							32.0	8.4	26%	32.0	8.4	26%	1.5008	0.7866	2.2806	0.7803	23	34
A2	Outfall	24.00	7.20			3.10	0.16							27.1	7.4	27%	59.1	15.7	27%	1.5078	0.7871	2.2895	0.7807	37	55
B21	B2	20.00	6.00			3.00	0.15	19.00	13.30					42.0	19.5	46%	42.0	19.5	46%	1.7596	0.8045	2.6383	0.7929	36	51
B20	B2	33.00	9.90	9.0	3.60									42.0	13.5	32%	42.0	13.5	32%	1.5855	0.7927	2.3915	0.7849	31	45
B5	B4	36.00	10.80											36.0	10.8	30%	36.0	10.8	30%	1.5562	0.7906	2.3526	0.7833	26	39
B4	B3	52.00	15.60	1.7	0.68									53.7	16.3	30%	89.7	27.1	30%	1.5588	0.7908	2.3561	0.7835	55	80
B3	B2	36.00	10.80	3.0	1.20					7.90	3.95			46.9	16.0	34%	136.6	43.0	32%	1.5768	0.7921	2.3799	0.7844	77	113
B2	Outfall			23.0	9.20	5.00	0.25	6.70	4.69			6.70	6.03	41.4	20.2	49%	262.0	96.2	37%	1.6452	0.7969	2.4729	0.7879	139	199
C3	C2	70.00	21.00			7.00	0.35							77.0	21.4	28%	77.0	21.4	28%	1.5243	0.7883	2.3109	0.7816	47	69
C2	Outfall	36.00	10.80			3.00	0.15							39.0	11.0	28%	116.0	32.3	28%	1.5260	0.7884	2.3130	0.7817	65	95
TOTALS		334.00	100.20	36.70	14.68	26.10	1.31	25.70	17.99	7.90	3.95	6.70	6.03	437.10	144.16	33%	437.10	144.16	33%						

[1] Sacramento Method Zone 2 peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.

TABLE D-16

CITY OF WEST SACRAMENTO
SOUTHPORT DRAINAGE MASTER PLAN UPDATE

SUBBASIN SC10
NOLTE METHOD DESIGN FLOW

From Node	To Node	Land Use								Total for Area Contributing at Node					Cummulative Total at Node								
		Nolte Formula Classification, R	Nolte Formula Classification, M					Nolte Formula Classification, C															
		AG, RR, RE, LR, MR, RP, O.S.	P/QP I= 60		HR I= 80		HRR I= 90		CC, NC, WRI, LI, HI, HSC,WRC,GC, O, BP, MU, RMU, MCI	Total Area	Nolte Formula Classification R Area	Nolte Formula Classification M Area	Nolte Formula Classification M Area * I	Nolte Formula Classification C Area	Total Cumulative Area	Nolte Formula Classification R Area	Nolte Formula Classification M Area	Nolte Formula Classification M Area * I	Nolte Formula Classification C Area	Nolte Formula Classification M Avgerage I	Qr	Qe	Qm	Nolte Zone 3 Qdesign[1]
		Area (acres)	Area (acres)	Area *	Area (acres)	Area * I	Area (acres)	Area *	Area (acres)	(acres)	(acres)	(acres)		(acres)	(acres)	(acres)	(acres)		(acres)		(cfs)	(cfs)	(cfs)	(cfs)
A3	A2	32.0								32.0	32.0				32.0	32.0					6.40	15.97		6.4
A2	Outfall	27.1								27.1	27.1				59.1	59.1					13.83	28.82		13.8
B21	B2	23.0			19.0	1,520				42.0	23.0	19.0	1520		42.0	23.0	19.0	1520.0		80	8.81	20.98	17.9	12.9
B20	B2	42.0								42.0	42.0				42.0	42.0					8.81	20.98		8.8
B5	B4	36.0								36.0	36.0				36.0	36.0					7.33	17.97		7.3
B4	B3	53.7								53.7	53.7				89.7	89.7					24.69	41.66		24.7
B3	B2	39.0	7.9	474						46.9	39.0	7.9	474		136.6	128.7	7.9	474.0		60	49.34	63.15	52.8	49.5
B2	Outfall	28.0			6.7	536			6.7	41.4	28.0	6.7	536	6.7	262.0	221.7	33.6	2530.0	6.7	75	115.02	130.08	124.5	116.6
C3	C2	77.0								77.0	77.0				77.0	77.0					19.69	36.22		19.7
C2	Outfall	39.0								39.0	39.0				116.0	116.0					37.32	53.44		37.3
TOTALS		396.8	7.9		25.7				6.7	437.1	396.8	33.6	2,530.0	6.7	437.1	396.8	33.6	2530.0	6.7	75				

[1] Nolte peak design flow based upon "Sacramento City/County Drainage Manual, Volume 2, Hydrology Standards," dated December 1996, and "City of West Sacramento Draft Drainage Design Flow Standards Analysis," dated May 17, 2000.